

**MOSS LANE EAST,
MANCHESTER**

**REPORT ON
SITE INVESTIGATIONS**

DATE

June 2024

CLIENT

Will Rudd Davidson (Glasgow) Ltd

Will Rudd Davidson (Glasgow) Ltd

Moss Lane East, Manchester

Report on Site Investigations

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EXECUTIVE SUMMARY

Client	Will Rudd Davidson (Glasgow) Ltd.
Site	Moss Lane East, Manchester.
Proposed Development	A new 9-storey residential flatted development with associated courtyard areas.
Project Objectives	▪ To investigate the possible presence of ground contamination associated with the historical uses of the site and any potential associated risks. ▪ To investigate the ground conditions and provide recommendations on foundation and infrastructure design. ▪ To provide recommendations (if any) for additional works / remediation required.
Topography and Surface Cover	The site was noted to be flat lying throughout with surface levels of approximately 37.50 mAOD and was occupied by flatted residential properties with associated parking and landscaped areas at the time of our investigations.
Site History	Based on a review of information obtained from historical ordnance survey maps, it is indicated that the site was occupied by a (presumed) residential property in the 1800's, which was redeveloped into two residential blocks (circa 1890) which remain to the present day. The surrounding area has been predominantly occupied by residential terraced blocks with occasional industrial / commercial land-uses since the early 1900's. As such, we would consider the site to be 'brownfield' in nature.
Recorded Ground Conditions	The ground conditions recorded MADE GROUND described as soft, brown, sandy, gravelly clay with fragments, of brick, burnt shale, concrete and traces of ash, proven to between 0.90 m and 1.20 m bgl underlain by natural glacial subsoils described as firm, brown and grey mottled orange, slightly silty CLAY (weathered), proven to between 1.70 m and 2.50 m bgl, underlain by stiff becoming very stiff, greyish brown, slightly silty, slightly gravelly CLAY (unweathered), proven to 8.20 m bgl. Sedimentary bedrock was encountered at rockhead depths of between 13.20 m and 14.20 m bgl (23.00 mAOD to 24.30 mAOD), described as heavily weathered red SANDSTONE. A shallow pervasive water table was not recorded below the site.

EXECUTIVE SUMMARY (Continued)

Assessment of Risks to Human Health, Vegetation and the Water Environment	Within the soil analyses, elevated toxic metal (lead) and poly aromatic hydrocarbon (benzo(a)pyrene and dibenzo(a,h)anthracene) contaminants were recorded within the shallow made ground soils. In addition, asbestos fibres were encountered within the made ground deposits between 0.50 m and 1.00 m depth. Subsequent quantification analyses recorded the total mass percentage of asbestos to range between <0.001% and 0.006% (i.e. low). It is considered that the shallow made ground soils pose a toxic risk to human health and therefore, we recommend that all future areas of soft landscaping (underlain by made ground materials) should be underlain by an environmental capping layer consisting of 600 mm clean, inert topsoil / subsoil further underlain by a high-visibility geotextile (i.e. an anti-dig layer). The shallow soils do not pose a phytotoxic risk to future plant life. Based on results from soil leachate and groundwater analyses plus our detailed risk assessment, it was concluded that the shallow soils do not pose a risk to the wider water environment (with the most sensitive receptor considered to be the deep bedrock groundwater).
Assessment of Ground Gas and Radon	Gas monitoring and our detailed risk assessment has indicated that ground gas protection measures are not required beneath the proposed development. From the site characteristic hazardous gas flow rate, as calculated and based on a worst-case scenario, the ground gas regime was classified as 'Characteristic Situation 1' and as such, ground gas preclusion measures are not considered necessary. Radon gas preclusion measures are not considered necessary.
Assessment of the Built Environment	Recommended concrete (ACEC) Classification is AC-Is with a Design Sulphate Class for the site of DS-2. Given the recorded ground conditions and results from the UKWIR analyses (which did not record any exceedances), we consider that that plastic (polyethylene) water supply pipes would be suitable for use within the site. Due to the presence of (albeit low quantity) asbestos fibres, all future water supply pipes should be laid in widened trenches (approximately 1.00 m wide) and backfilled with clean, inert material.
Infiltration Testing	Falling head permeability tests were undertaken within two of the boreholes which were not able to provide an infiltration rate, which was to be expected given the cohesive nature of the shallow soils. As such, we do not consider the shallow soils below the site to be suitable for natural drainage purposes.

EXECUTIVE SUMMARY (Continued)

Foundation Construction	It is our understanding that given the load requirements of the proposed development, the Engineer is proposing a piled foundation solution. Based on existing site levels, the stiff / dense (or better) natural (unweathered) clay subsoils may be suitable for use as a foundation bearing horizon. These soils would provide an allowable bearing capacity of 100 kN/m² between depths of approximately 1.70 m to 2.50 m bgl, 150 kN/m² between depths of approximately 2.50 m to 5.00 m bgl and 200 kN/m² from depths of approximately 5.00 m to 13.20 m (i.e. down to rockhead). Alternatively, the underlying weathered SANDSTONE bedrock could be used as a foundation bearing horizon which would provide an allowable bearing capacity of 500 kN/m² from depths between approximately 13.20 m and 18.00 m bgl. We would recommend that future piled foundations do not straddle between the soil and the rock in order to limit the potential for differential settlement to occur. Detailed discussions with specialist contractors and the structural engineer should be undertaken with regard to the final design of the piled foundations. Finally, since our ground investigations consisted of soil bores and not trial pits, the side wall stability is currently unknown. If further information is required on side wall stability, this will need to be assessed during future excavation works.
Mining and Quarrying	We conclude that the site is not at risk from ground instability, associated with historical underground mining or quarrying activities
Invasive Plant Species	Our site walkover survey did not identify the presence of any non-native invasive plant species within the site. However, we would recommend that a specialist survey be undertaken during the growing season to confirm (or otherwise).
Flood Risk	The Groundsure report indicated that the site was at 'negligible' risk of surface water flooding. If more detail is required, we would recommend a detailed flood risk assessment be undertaken.
Service Information	No services operated by BT were indicated within the site, however, an overhead cable was noted to the immediate east. Several buried low-voltage ENWL cables were recorded below the northern site area, connecting from Moss Lane East to the existing buildings on-site. Furthermore, two low-pressure Cadent gas main pipes were recorded below the northern site area, again connecting from Moss Lane East to the existing buildings. No United Utilities water mains services were recorded within the site. Similarly, no Virgin Media utilities were recorded within the site, though were recorded in the immediate surrounding area. Importantly, the potential for local buried services should not be discounted.

I.0 INTRODUCTION

I.1 Commission

I.1.1 Mason Evans Partnership were commissioned by Will Rudd Davidson (Glasgow) Ltd (the Client's representative) to undertake ground investigations in connection with the proposed development at a site (0.18 Ha) titled 'Moss Lane East, Manchester' (Drawing Nos. P23/483/SI/R/F/01 and 02).

I.1.2 Mason Evans supervised ground investigations at the captioned site to determine the underlying ground conditions in relation to the proposed 9-storey flatted residential development with associated courtyard areas. A proposed development layout plan is shown in Drawing No. P23/483/SI/R/F/03.

I.2 Investigation Proposals

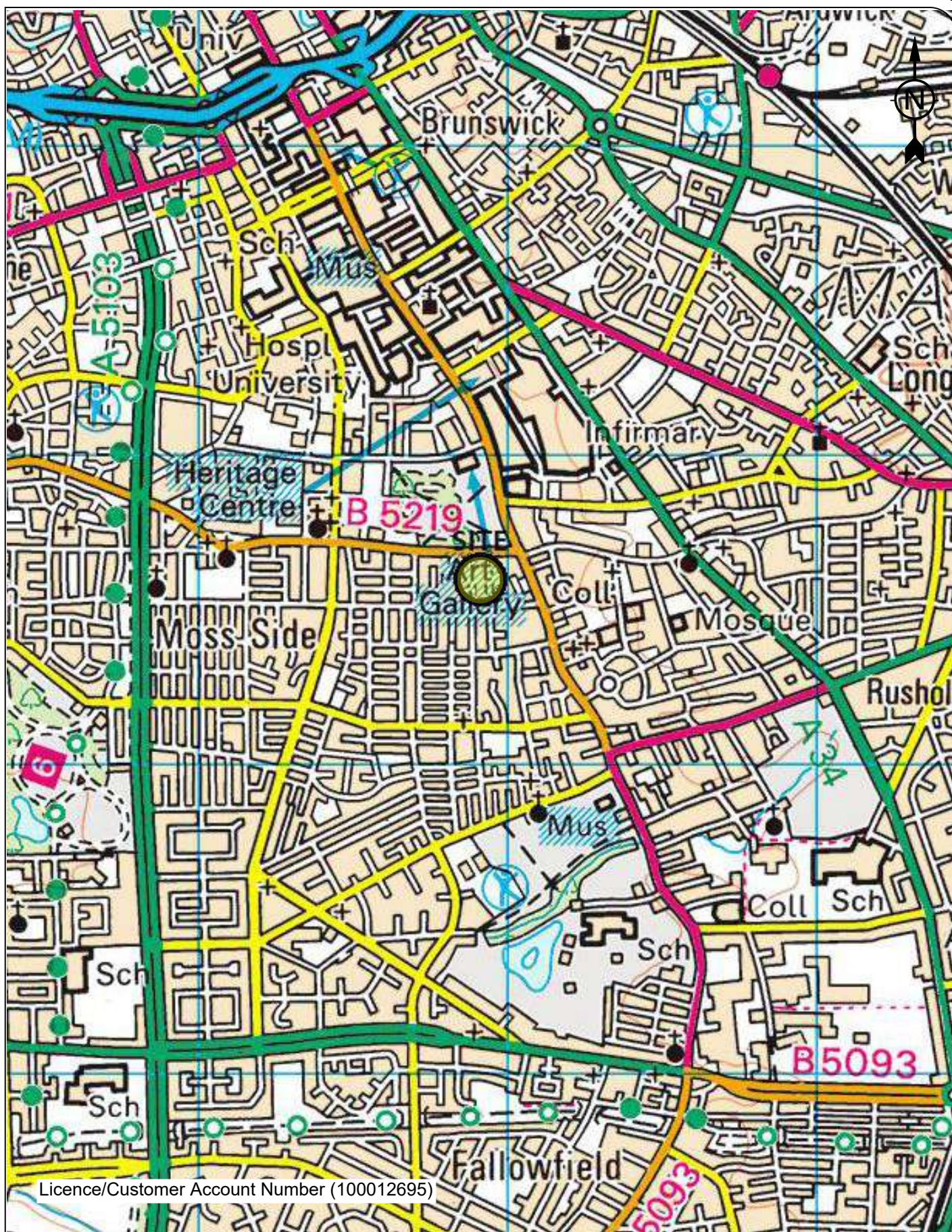
I.2.1 The intention of the ground investigations was to provide information on the following:

- Soil, groundwater and rockhead profiles.
- Chemical contamination conditions.
- Ground gas emissions.
- Geotechnical characteristics of the materials.
- Foundation bearing characteristics.
- Mining and quarrying constraints (if any).

I.3 Limitations

I.3.1 Our interpretations of the ground conditions are based on the information retrieved from the soil bores within the site during the recent investigations. While we have carried out interpretation of the ground conditions between the exploratory locations, it should be recognised that soil and groundwater conditions can vary from point to point. As such, ground conditions at variance with those indicated by the exploratory pits / bores may exist in areas not investigated.

I.3.2 It should be recognised that this report is prepared in accordance with current recommended practice and existing legislation. It is written in the context of a proposed new 9-storey residential flatted development with associated courtyard areas. Should there be any alternative end-use, it would be prudent to consult us further to ensure the continued pertinence of the recommendations advised

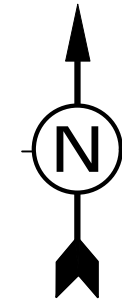
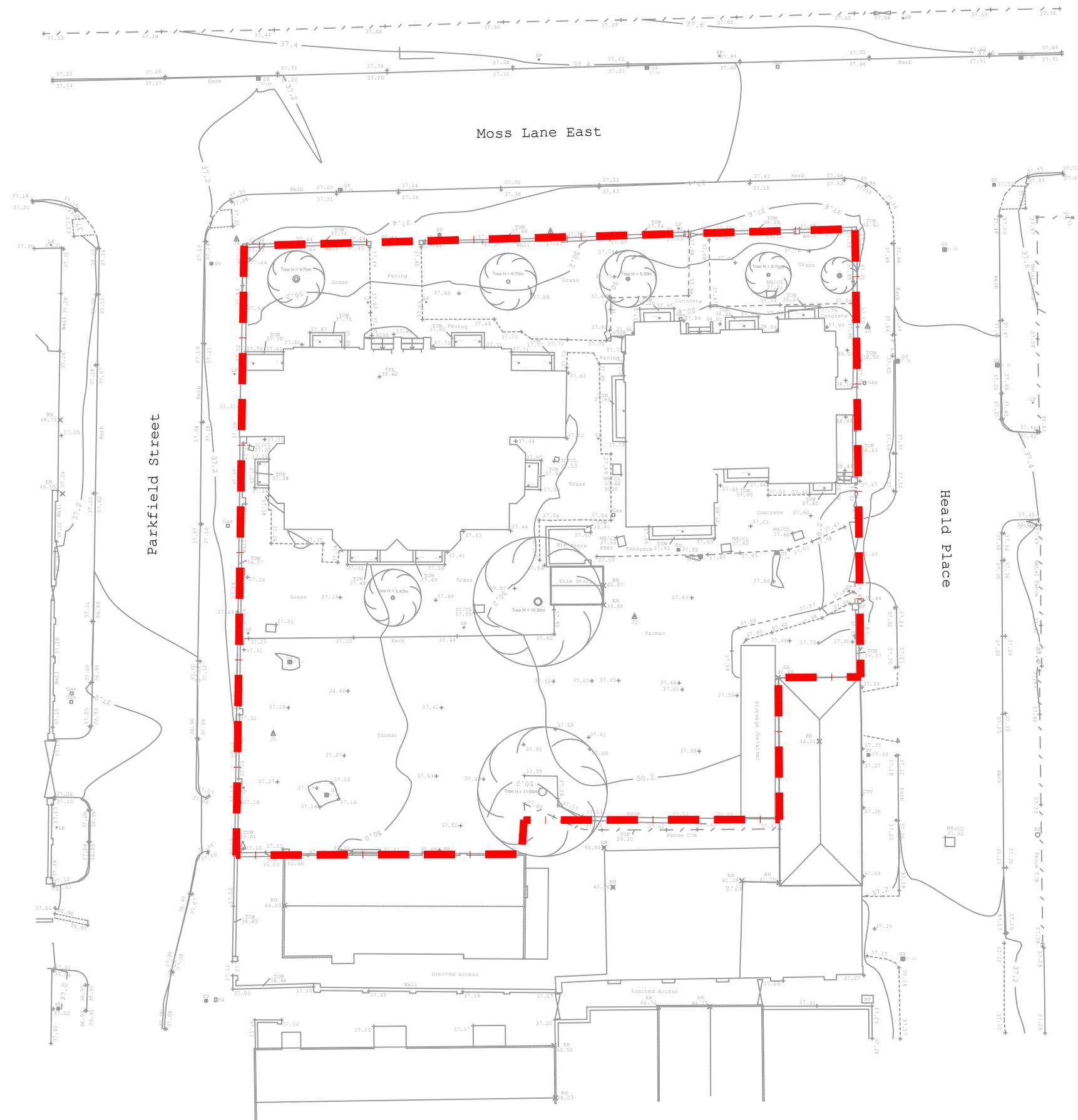


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project title:		MOSS LANE EAST MANCHESTER		drawing title:	
				SITE LOCATION PLAN	
project no:	drawing no:	revision:	date:	drawn by:	approved by:
P23/483	P23/483/SI/R/F/01		29.04.24	AC	AMcG
				scale:	Not to Scale



NOTES

--- Approximate site boundary

REV	DATE	DETAILS
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WILL RUDD DAVIDSON (GLASGOW) Ltd
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PROJECT TITLE

MOSS LANE EAST
MANCHESTER

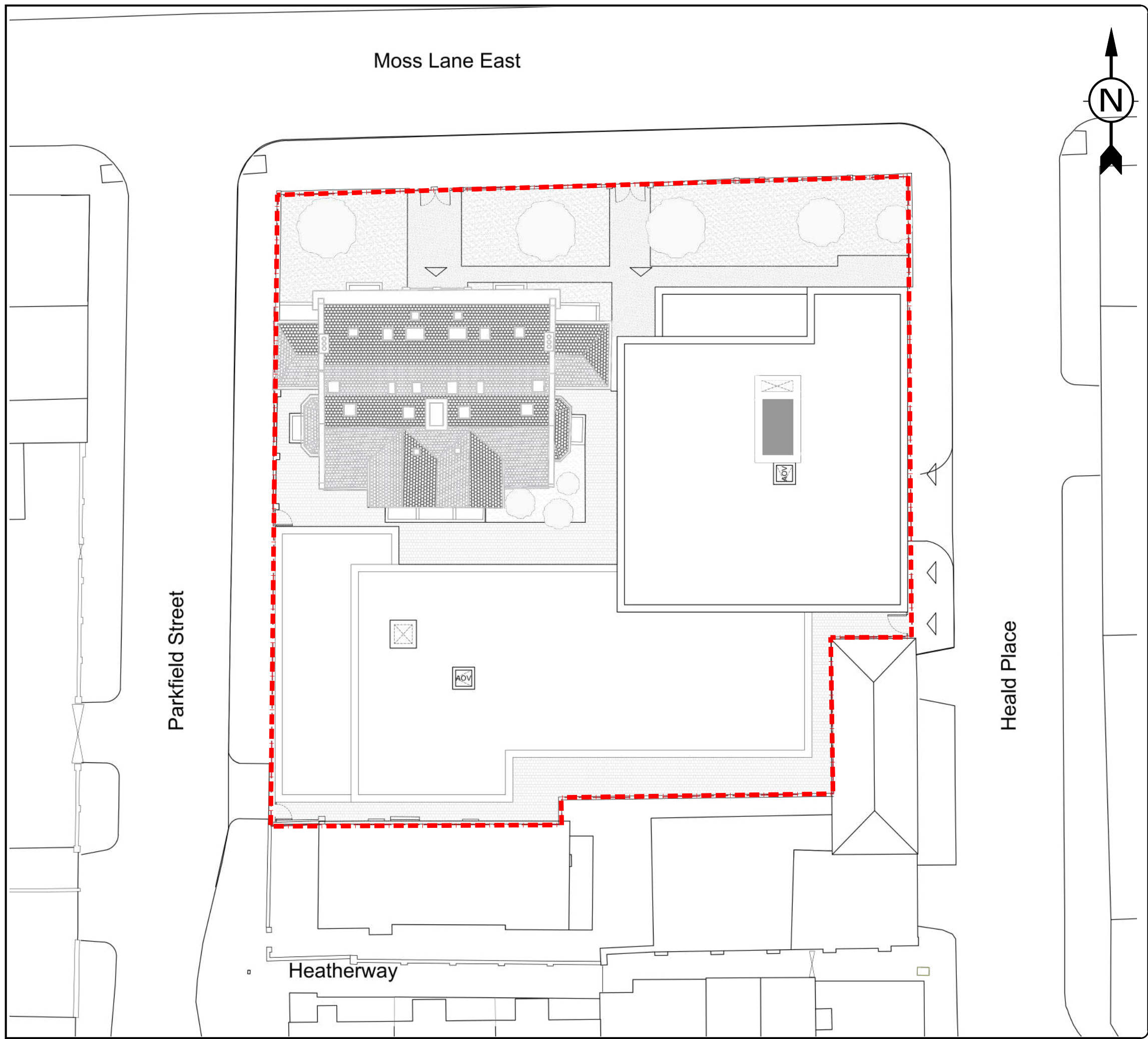
DRAWING TITLE

TOPOGRAPHIC
SURVEY

DRAWN BY	CHK'D BY	APP'D BY	DATE	SCALES
AC	SA	AMcG	29.04.24	Not to Scale
PROJECT No.	DRAWING No.	REVISION		
P23/483	P23/483/SI/R/F/02			

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NOTES

--- Site boundary

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MANCHESTER

DRAWING TITLE

PROPOSED DEVELOPMENT
LAYOUT PLAN

DRAWN BY AC	CHK'D BY SA	APP'D BY AMcG	DATE 29.04.24	SCALES Not to Scale
PROJECT No. P23/483	DRAWING No. P23/483/SI/R/F/03	REVISION		

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2.0 DESK STUDY INFORMATION

2.1 The Site

- 2.1.1 The context of the site (0.18 Ha) is indicated on Plate 01, which shows it to be bound by Moss Lane East (B5219) to the north, Heald Place to the east with commercial land beyond, Parkfield Street to the west with residential properties beyond and residential properties to the south. The main access route into the site was from Heald Place to the east, as shown below.

Plate 01 – Aerial Photograph of the Site (courtesy of Google Maps)



- 2.1.2 A summary of the current site conditions as understood from the supplied survey information and site reconnaissance is included in Table 01 overleaf. A site walkover was undertaken in February 2024 (included in Appendix 01), a Groundsure Report (included in Appendix 02) was procured, and a review of publicly available information was undertaken (included in Appendix 03).

Table 01 – Site Details and Review of Public Records

Site Name	Moss Lane East, Manchester.
National Grid Ref	384867, 395648.
Site Area	Approximately 0.18 Ha.
Topography	The site was noted to be flat lying throughout with surface levels of approximately 37.50 mAOD (refer to Drawing No. P23/483/SI/R/F/02).
Current Usage	The site was occupied by flatted residential properties with associated parking and landscaped areas at the time of investigations.
Proposed Use	Development of a new 9-storey flatted residential block with associated courtyard areas (refer to Drawing No. P23/483/SI/R/F/03).
Surface Water	There were no surface water features identified within 500 m of the site.
Groundwater	The Department for the Environment and Rural Affairs (DEFRA) Magic Map indicates the site is underlain by a secondary (undifferentiated) unproductive aquifer, and a principal groundwater aquifer within the bedrock (Appendix 03). As such, it is considered that any groundwater within the superfcials will likely be perched and discontinuous (as a result of surface water infiltration) and not part of a wider pervasive body, whilst the underlying aquifer within the bedrock would be representative of a pervasive system.
Flood Risk	The Groundsure report (Appendix 02) indicated that the site was at 'negligible' risk of surface water flooding. If more detail is required, we would recommend a detailed flood risk assessment be undertaken.
Public Register Information	The Groundsure report (Appendix 02) indicated that no historical industrial land uses have existed within the site. However, industrial developments have existed within the surrounding area, most notably including an infirmary (15 m to the north-west), a garage (21 m to the south-east), an unspecified factory (24 m to the east), an unspecified commercial / industrial unit (47 m to the east), a depository (108 m to the east), a laundry (154 m to the south-east), a boat house (156 m to the north-west) and a quilt works (158 m to the north-east). No discharge consents were recorded within 100 m of the site. In addition, no landfill sites were recorded within 250 m of the site. There were no groundwater abstraction wells recorded within 500 m of the site. No fuel stations were recorded within 100 m of the site. The closest entry was indicated to be a Shell garage located 205 m to the south-east.
Services	No services operated by BT were indicated within the site, however, an overhead cable was noted to the immediate east. Several buried low-voltage ENWL cables were recorded below the northern site area, connecting from Moss Lane East to the existing buildings on-site. Furthermore, two low-pressure Cadent gas main pipes were recorded below the northern site area, again connecting from Moss Lane East to the existing buildings. No United Utilities water mains services were recorded within the site. Similarly, no Virgin Media utilities were recorded within the site, though were recorded in the immediate surrounding area. Importantly, the potential for local buried services should not be discounted. Copies of the available service drawings are included in Appendix 04.
Fuel Tanks	Mason Evans were not made aware of any buried fuel tanks within the site. In addition, the Groundsure report did not identify any tanks within 250 m of the site.
Radon	The Groundsure report stated that the site was in a low-risk radon area (where less than 1% of homes are estimated to be at or above the Action Level).
Invasive Plants	Our site walkover survey did not identify the presence of any non-native invasive plant species within the site. However, we would recommend that a specialist survey be undertaken during the growing season to confirm (or otherwise).

2.2 Site History

2.2.1 A summary of the history of the site and surrounding area is presented in Table 02 below and a copy of the maps and datasheets are included in Appendix 02.

Table 02 – Summary of History (Ordnance Survey Map Records)

Ordnance Survey Map Edition	The Site	The Surrounding Area
1848 (1:1,056 scale) 1849 - 1849 (1:10,560 scale)	A building named 'Stuley Place' was recorded on-site (presumed residential) with an associated garden area.	The surrounding area generally consisted of unoccupied land (possibly agricultural) with residential properties and roads, within the south side of Manchester.
1893 (1:2,500 scale) 1890 - 1892 (1:10,560 scale)	The residential property had been demolished and two (residential) buildings were developed within the northern site area.	- Significant residential expansion to both the immediate and wider surrounding area (particularly to the north and west). - A tramway depot was recorded approximately 120 m to the south-east. - A laundry was recorded approximately 150 m to the south-east.
1908 (1:2,500 scale) 1905 (1:10,560 scale)	No changes were recorded.	- A tramway was formed along Moss Lane East to the immediate north. - Whitworth Park was formed to the north of the site. - Further significant terraced residential expansion to the south-west. - No other significant changes were recorded.
1922 (1:2,500 scale) 1923 (1:10,560 scale)	No changes were recorded.	- Whitworth Park Handkerchief Factory was developed 75 m to the east. - An infirmary was developed approximately 200 m to the north-east of the site. - An Art Gallery & Museum was developed 260 m to the north. - No other significant changes were recorded.
1933 (1:2,500 scale) 1932 - 1934 (1:10,560 scale)	Three small buildings (possible garages) developed along the eastern and southern boundaries.	- Industrial buildings comprising 'Britannia Quilt Works' and 'Daimler Motor Repair Works' were developed approximately 150 m to the north-east of the site. - A football ground was developed 750 m to the south-west. - No other significant changes were recorded.
1950 (1:2,500 scale) 1955 - 1956 (1:10,560 scale)	No changes were recorded.	- The tramway to the immediate north had been removed. - No other significant changes were recorded.
1980 - 1983 (1:10,000 scale)	No changes were recorded.	No changes were recorded.
1989 - 1991 (1:1,250 scale) 1988 - 1991 (1:10,000 scale)	The small (presumed garage) buildings had been removed.	- Redevelopment of residential properties to the south of the site. - The Coach Works located 100 m to the south-east was demolished. - No other significant changes were recorded.
2003 (1:1,250 scale) 2001 (1:10,000 scale)	No changes were recorded.	No significant changes were recorded.
2010 (1:10,000 scale)	No changes were recorded.	- A new school was developed approximately 150 m to the north-west. - Slight re-development / expansion within the wider surrounding area.
2024 (1:10,000 scale)	No changes were recorded.	Further re-development / expansion within the surrounding area (notably to the infirmary to the north-east).

2.2.2 Based on a review of information obtained from historical ordnance survey maps, it is indicated that the site was occupied by a (presumed) residential property in the 1800's, which was redeveloped into two residential blocks (circa 1890) which remain to the present day.

2.2.3 The surrounding area has been predominantly occupied by residential terraced blocks with occasional industrial / commercial land-uses since the early 1900's.

2.2.4 As such, we consider the site to be 'brownfield' in nature.

2.3 **Published Geology and Mining Information**

Superficial Deposits

2.3.1 Given our review of the site history, it is considered that made ground (though not of significance) will likely exist below the site.

2.3.2 The BGS Drift Lithology Map (Drawing No. P23/483/SI/R/F/04) indicated the underlying natural subsoil to consist of glacial TILL (i.e. 'boulder clay') deposits, the thickness of which was not indicated.

2.3.3 No BGS historical borehole records were available within 150 m of the site, though records in the wider surrounding area recorded rockhead at approximately 12 m depth.

Solid Geology

2.3.4 The BGS Solid Geology Map (Drawing No. P23/483/SI/R/F/05) indicated the underlying solid strata to belong to the Triassic aged Chester Formation, comprising sedimentary SANDSTONE.

2.3.5 No geological faults were recorded in proximity to the site.

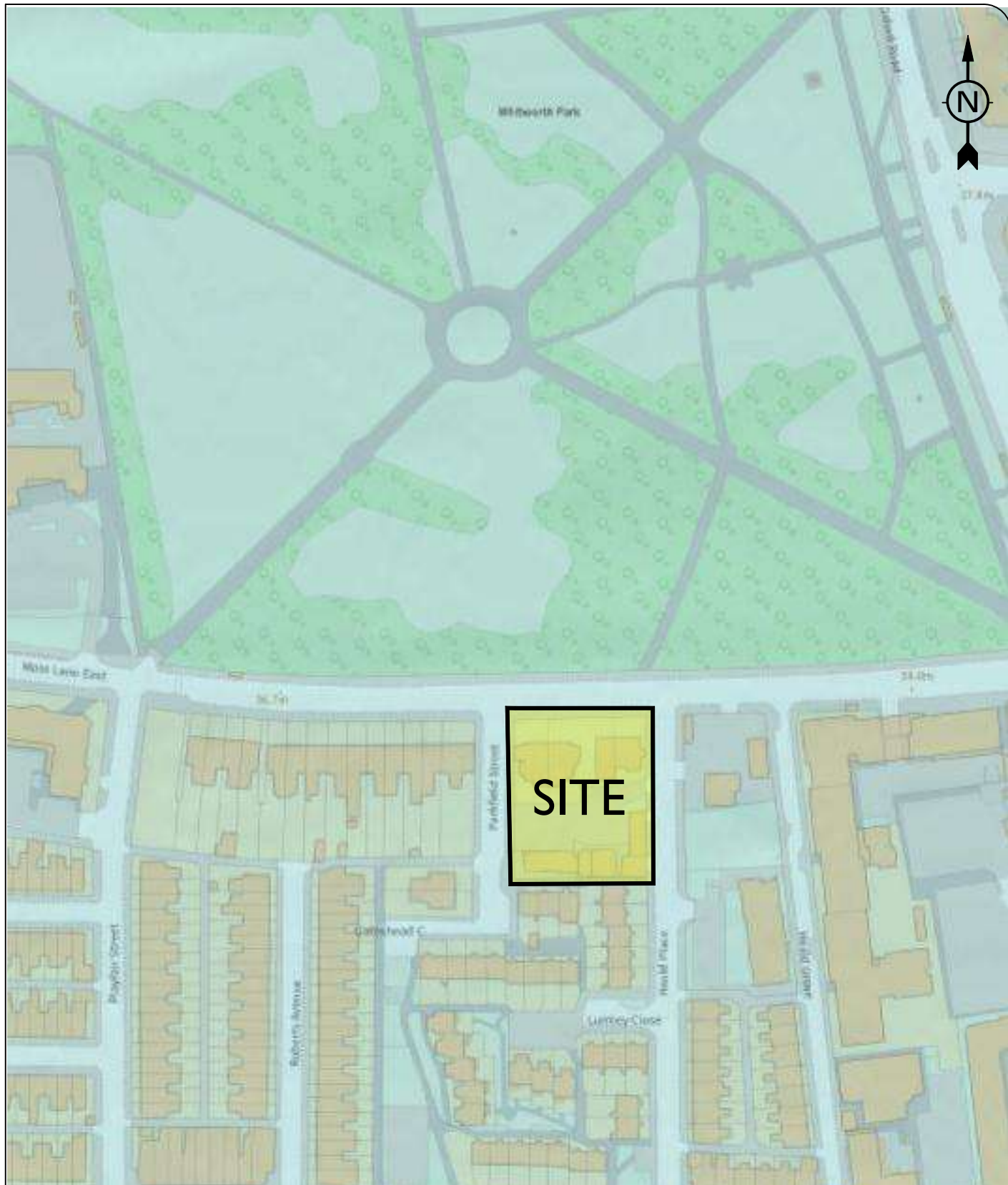
Mining Information

2.3.6 The site is not located within a Coal Mining Reporting Area (refer to Appendix 05), meaning that it does not lie within the known extent of past coal mining activity.

2.3.7 Additionally, The BGS non-coal mining plans did not record any non-coal mining extractive activities below the site (Appendix 05).

2.3.8 Furthermore, a review of the historical OS maps did not indicate the presence of historical quarrying activity within the site, or the immediate surrounding area (Appendix 02).

2.3.9 As such we do not consider the site to be at risk of ground instability as a result of historical mining or quarrying activities.



SITE

Superficial deposits

Till, Devensian - Diamicton. Sedimentary superficial deposit formed between 116 and 11.8 thousand years ago during the Quaternary period.



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project title:

MOSS LANE EAST
MANCHESTER

drawing title:

EXTRACT FROM PUBLISHED GEOLOGICAL
SURVEY MAP (DRIFT LITHOLOGY)

project no:
P23/483

drawing no:
P23/483/SI/R/F/04

revision:

date:
29.04.24

drawn by:
AC

approved by:
AMcG

scale:
Not to Scale



SITE

Bedrock geology

Chester Formation - Sandstone. Sedimentary bedrock formed between 250 and 247.1 million years ago during the Triassic period.



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project title:

MOSS LANE EAST
MANCHESTER

drawing title:

EXTRACT FROM PUBLISHED GEOLOGICAL
SURVEY MAP (SOLID GEOLOGY)

project no:
P23/483

drawing no:
P23/483/SI/R/F/05

revision:

date:
29.04.24

drawn by:
AC

approved by:
AMcG

scale:
Not to Scale

Hydrogeology

- 2.3.10 Interpretation of the site hydrogeology required consideration of the general geological conditions. In this instance, the available information indicated the site to be potentially comprised of three geological units: made ground, glacial till and sedimentary bedrock. The typical permeabilities of each of these strata are recorded in Table 03.

Table 03 – Typical Material Permeability

Strata	Typical Permeability Range (m/sec)*
Made Ground	Variable**
Glacial Till	Low
Sedimentary Bedrock	Low to Moderate

* Ref: Freeze and Cherry (Groundwater – 1979, Table 2.2).

** No permeability range indicated for made ground, however based on our experience, the make-up of made ground is often variable.

- 2.3.11 At present, surface run-off below the northern site area would likely be low given that this part of the site was surfaced in soft landscaping, whilst surface run-off below the southern site area would likely be high given that this part of the site was surfaced in hardstanding. Consequently, infiltration of surface water below the northern site area would likely be high, whilst infiltration below the southern site area would likely be low.
- 2.3.12 There were no surface water features identified within 500 m of the site, and as such, the surface water is not considered to be a potential sensitive receptor.
- 2.3.13 The underlying shallow soils were indicated to include cohesive soils which would unlikely be susceptible to vertical and lateral groundwater movement. Whilst groundwater may be encountered within the shallow soils underlying the site, it will likely be localised and perched, the result of surface water infiltration.
- 2.3.14 As such, we consider the most sensitive water receptor to likely be deep groundwater within the bedrock. This would be confirmed (or otherwise) following Phase II intrusive investigation works.
- 2.3.15 In consideration of the available information regarding groundwater, the following general comments could be made.

Table 04 – Surface Water and Groundwater Pathways

Surface water run-off	Surface water run-off below the northern site area would likely be low given that this part of the site was surfaced in soft landscaping, whilst surface run-off below the southern site area would likely be high given that this part of the site was surfaced in hardstanding. Consequently, infiltration of surface water below the northern site area would likely be high, whilst infiltration below the southern site area would likely be low.
Groundwater below the site	Any made ground could allow vertical and lateral water movement if material constituents have high infiltration and permeability rates. Given the low permeability of glacial soils, we consider it unlikely that a shallow pervasive groundwater body will exist. A deeper groundwater body is likely to be present at or below the bedrock level which is considered to exist as separate system from any potential groundwater body within the shallow subsoils.

2.4 Preliminary Conceptual Site Model

2.4.1 In order to fully evaluate the potential presence and impact of contamination at the site, the area must be considered in an environmental context taking account of its geology, topography, past and present land-use. Science Report SC050021/SR3, published by the Environment Agency in January 2009, supersedes the previous Contaminated Land Reports (CLR7 to CLR10 and briefing notes) series and provides standard guidance for the assessment of sites that may be contaminated. This essentially highlights the importance of developing a robust *Conceptual Site Model*. The model then forms an integral part of the contamination assessment for the proposed development site, looking at conventional source-pathway-receptor linkages.

2.4.2 Statutory guidance sets the definition of contaminated land within the context of the “suitable for use” approach. It is based on the principles of risk assessment, including the concept of a **pollutant linkage** between a **source** contaminant and a **receptor**, by means of a **pathway**. This concept is considered further below.

2.4.3 The presence of all three elements identifies a plausible pollutant linkage. An assessment of the potential sources, pathways and receptors constitutes a conceptual model for the site.

2.5 Source Characterisation

2.5.1 Our researches have indicated that the north-western site area is underlain by made ground, which may contain soil contaminants.

2.5.2 The potential on-site sources of contamination identified by this desk study are:

- Deposition of contaminated materials associated with made ground soils.
- Generation and accumulation of ground gases associated with made ground soils.
- Spillage of and leakages of contaminants.

2.5.3 The potential off-site sources of contamination identified by this desk study are:

- Deposition of contaminated materials during construction and usage of the neighbouring developments and roads.
- Generation and accumulation of ground gases associated with made ground soils.
- Spillage of and leakages of contaminants.
- Contaminants transported from surface water run-off.

2.5.4 The typical processes involved, and associated Contaminants of Concern (COC) are discussed and summarised in Table 05.

Table 05 – Contaminants of Concern

THE SITE	Industrial Activity/ Site Use	Potential Pathways	Associated Potential Contaminants
CURRENT	• Residential buildings with associated parking.	• Deposition of contaminated materials. • Spillage of and leakages of contaminants. • Generation of ground gases.	Metals: As, Cd, Cr, Ni, Zn, Cu, Hg, Pb Organics: Fuel oils, PAH, Phenol, Miscellaneous: Asbestos Ground Gasses: CO ₂ , CH ₄
PREVIOUS	• Residential development.	• Deposition of contaminated materials. • Spillage of and leakages of contaminants. • Generation of ground gases.	Metals: As, Cd, Cr, Ni, Zn, Cu, Hg, Pb Organics: Fuel oils, PAH, Phenol, Miscellaneous: Asbestos Ground Gasses: CO ₂ , CH ₄
IMMEDIATE SURROUNDING AREA	Industrial Activity/ Site Use	Potential Pathways	Associated Potential Contaminants
CURRENT	• Roads. • Residential.	• Deposition of contaminated materials during development works and usage. • Spillage of and leakages of contaminants. • Generation of ground gases.	Metals: As, Cd, Cr, Ni, Zn, Cu, Hg, Pb Organics: Fuel oils, PAH, Phenol Miscellaneous: Asbestos Ground Gasses: CO ₂ , CH ₄
PREVIOUS	• Roads. • Residential. • Tramway. • Public Park.	• Deposition of contaminated materials during development works and usage. • Spillage of and leakages of contaminants. • Generation of ground gases.	Metals: As, Cd, Cr, Ni, Zn, Cu, Hg, Pb Organics: Fuel oils, PAH, Phenol Miscellaneous: Asbestos Ground Gasses: CO ₂ , CH ₄

2.6 Pathway Characterisation (Pollutant Linkages)

2.6.1 The pathways by which sensitive receptors may be exposed to potential sources of contamination, as determined by the proposed end use for the site are as follows:

- I. Humans – site end users and construction workers (outdoor)
 - Dermal (skin) contact with contaminated soil, fugitive dust and the absorption of any contaminants through the skin into the body.
 - Inhalation of fugitive soil dust or vapour.
 - Ingestion of soil by hand to mouth activity.

2. Humans – site end users (indoor)
 - Inhalation of any ground gas migrating into the buildings.
 - Inhalation of soil derived dust.
3. Buildings
 - Potential soil gas generated in the ground vertically migrating and pooling within the structure.
 - Contact with aggressive or acidic soils will affect the concrete design of the foundations.
4. Services including the domestic water supply
 - Direct contact with contaminated soil or groundwater.
 - Leaching of contaminants through the soil.
 - Service trenches acting as preferential migration pathways for contamination.
 - Permeation of plastic water supply pipes.
5. Vegetation (plants in gardens and landscaped areas)
 - Direct contact with contaminated soils and groundwater.
 - Uptake of contaminants from the soil or groundwater into the plant.
6. Water Environment (groundwater i.e. the deep bedrock aquifer)
 - Leaching of contaminants from the soil to groundwater.
 - Contaminant migration off-site in the groundwater.

2.6.2 On the basis of the findings of the preliminary conceptual site model, investigations were considered necessary in order to establish more precisely the geology of the site, the gaseous condition of the site, the geotechnical properties of the shallow soils and to confirm that there are no contamination issues.

Table 6A – Preliminary Qualitative Risk Assessment – On Site

Source	COCs	Pathway	Receptors (s)	Assessment	Further Investigation Required
1. Areas of potentially contaminated made ground	Metals, semi-metals and non-metals: As, Cd, Cr, Ni, Zn, Cu, Hg, Pb Organics: Hydrocarbons, PAH, Fuel oil, Phenol Miscellaneous: Asbestos, Sulphate Ground gasses: CO ₂ , CH ₄	Dermal contact, ingestion, inhalation	Human – site workers	Spillage/leakage of contaminants impacting near surface soils.	Yes
			Humans – end users (outdoor)	Contaminated materials may have been deposited within the site.	
		Leaching through soil or direct migration	The water environment - groundwater	Contaminants may be leached and potentially mobilised from the soil by percolation and/or shallow groundwater movement.	Yes
		Direct contact, leaching through soil, groundwater migration	Buildings and services	Potential for aggressive chemical environments for concrete due to sulphate and acidic conditions. Presence of contaminants in soil that may permeate water supply pipes.	Yes
		Gas / vapour inhalation, vertical/lateral migration	Buildings and services	Contamination may include gas/vapour producing materials or compounds that could vertically migrate into overlying buildings producing a potentially asphyxiating or explosive environment.	Yes
			Humans – end users (indoor)		
		Direct contact, uptake	Plants	Direct contact or uptake of contamination from the soil or groundwater could adversely affect any plants grown.	Yes
		Migration in the groundwater	Groundwater	Contaminants could impact the groundwater and migrate off-site.	Yes
		Point source discharge	Surface water	None.	No
		Diffuse source	Surface Water	None.	No

Table 6B – Preliminary Qualitative Risk Assessment – Off-Site

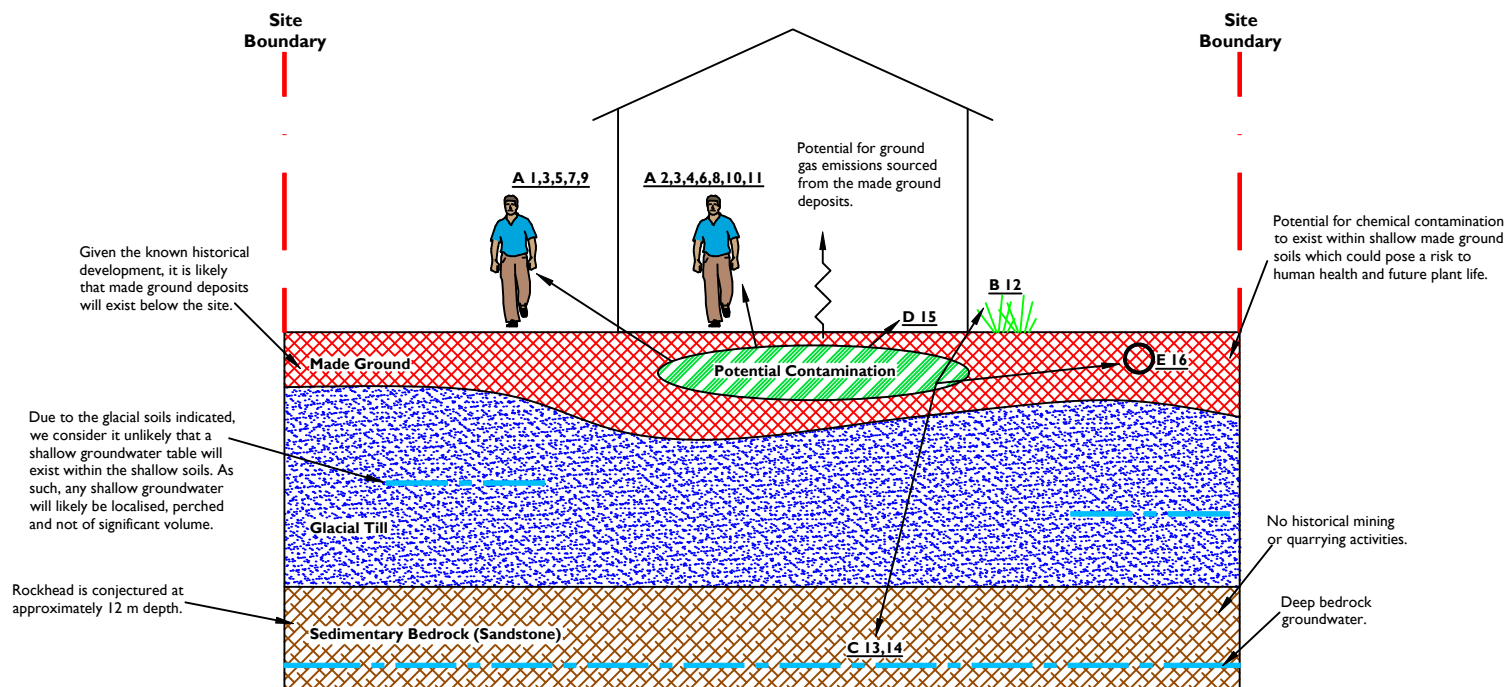
Source	COCs	Pathway	Receptors (s)	Assessment	Further Investigation Required
I. Areas of potentially contaminated made ground	Metals, semi-metals and non-metals: As, Cd, Cr, Ni, Zn, Cu, Hg, Pb Organics: Hydrocarbons, PAH, Fuel oils, Phenols Miscellaneous: Asbestos, Sulphate Ground gasses: CO ₂ , CH ₄	Dermal contact, ingestion, inhalation	Human – site workers Humans – end users (outdoor)	Spillage/leakage of contaminants impacting near surface soils. Contaminated materials may have been deposited within the site.	Yes
		Leaching through soil or direct migration	The water environment - groundwater	Contaminants may be leached and potentially mobilised from the soil by percolation and/or shallow groundwater movement.	Yes
		Direct contact, leaching through soil, groundwater migration	Buildings and services	Potential for aggressive chemical environments for concrete due to sulphate and acidic conditions. Presence of contaminants in soil that may permeate water supply pipes.	Yes
		Gas / vapour inhalation, vertical/lateral migration	Buildings and services Humans – end users (indoor)	Contamination may include gas / vapour producing materials or compounds that could vertically migrate into overlying buildings producing a potentially asphyxiating or explosive environment.	Yes
		Direct contact, uptake	Plants	Direct contact or uptake of contamination from the soil or groundwater could adversely affect any plants grown.	Yes
		Migration in the groundwater	Groundwater	Contaminants could impact the groundwater and migrate off-site.	Yes
		Point source discharge	Surface water	None.	No
		Diffuse source	Surface Water	None.	No

2.7 Receptor Characterisation

2.7.1 Potential receptors at the site are defined on the basis of the site proposal, which will include the development of new residential properties with gardens, areas of soft landscaping and road infrastructure. The following receptors are considered relevant to this site:

- Humans – site end users and construction works (outdoor),
- Humans – site end users (indoor),
- Buildings and services (including water supply pipes and buried concrete),
- Vegetation (plants in any proposed soft landscaped areas),
- Water Environment (groundwater i.e. deep bedrock aquifer).

2.7.2 The potential source-receptor-pathway linkages identified for this site are illustrated within our Preliminary Conceptual Site Model (Drawing No. P23/483/SI/R/F/06) and on Tables 6A and 6B. Site investigations were required to confirm or otherwise the existence of such linkages in addition to providing further confirmation of the geological and geotechnical conditions.



Potential Source

- Made ground (containing toxic / phytotoxic contaminants and acting as a source of ground gas).

Potential Exposure Pathways

1. Outdoor ingestion of dust.
2. Indoor ingestion of dust.
3. Consumption of homegrown vegetables.
4. Ingestion of soil attached to vegetables.
5. Skin contact with outdoor soil.
6. Skin contact with indoor dust.
7. Outdoor inhalation of dust.
8. Indoor inhalation of dust.
9. Outdoor inhalation of soil vapour.
10. Indoor inhalation of soil vapour.
11. Inhalation of ground gases.
12. Contaminant uptake by vegetation.
13. Leaching of contaminants to the groundwater.
14. Contaminant migration in the groundwater.
15. Detrimental effects on buried concrete.
16. Permeation of plastic water supply pipes.

Potential Receptors

- A. Site users / construction personnel.
- B. Vegetation / fauna.
- C. Groundwater.
- D. Buried concrete (Service and foundations)
- E. Plastic water supply pipes.

NOTES

Our site walkover survey did not identify the presence of any non-native invasive plant species within the site. However, we would recommend that a specialist survey be undertaken during the growing season to confirm (or otherwise).

REV	DATE	DETAILS

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G1 1TF

PROJECT TITLE

MOSS LANE EAST
MANCHESTER

DRAWING TITLE

PRELIMINARY CONCEPTUAL
SITE MODEL

DRAWN BY AC	CHK'D BY SA	APP'D BY AMcG	DATE 29.04.24	SCALE Not to Scale
PROJECT No. P23/483	DRAWING No. P23/483/SI/R/F/06	REVISION		

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3.0 SITE INVESTIGATIONS

3.1 General

3.1.1 The scope and location of works was non-targeted with our exploratory hole locations covering the site (where accessible) at approximately 15 m centres. Site works undertaken were implemented generally in accordance with BS5930:2015 + A1:2020 and BS10175:2011 + A2:2017.

3.1.2 The following investigation works were undertaken:

Table 07 – Site Investigations

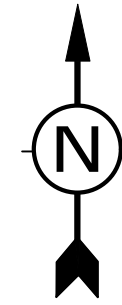
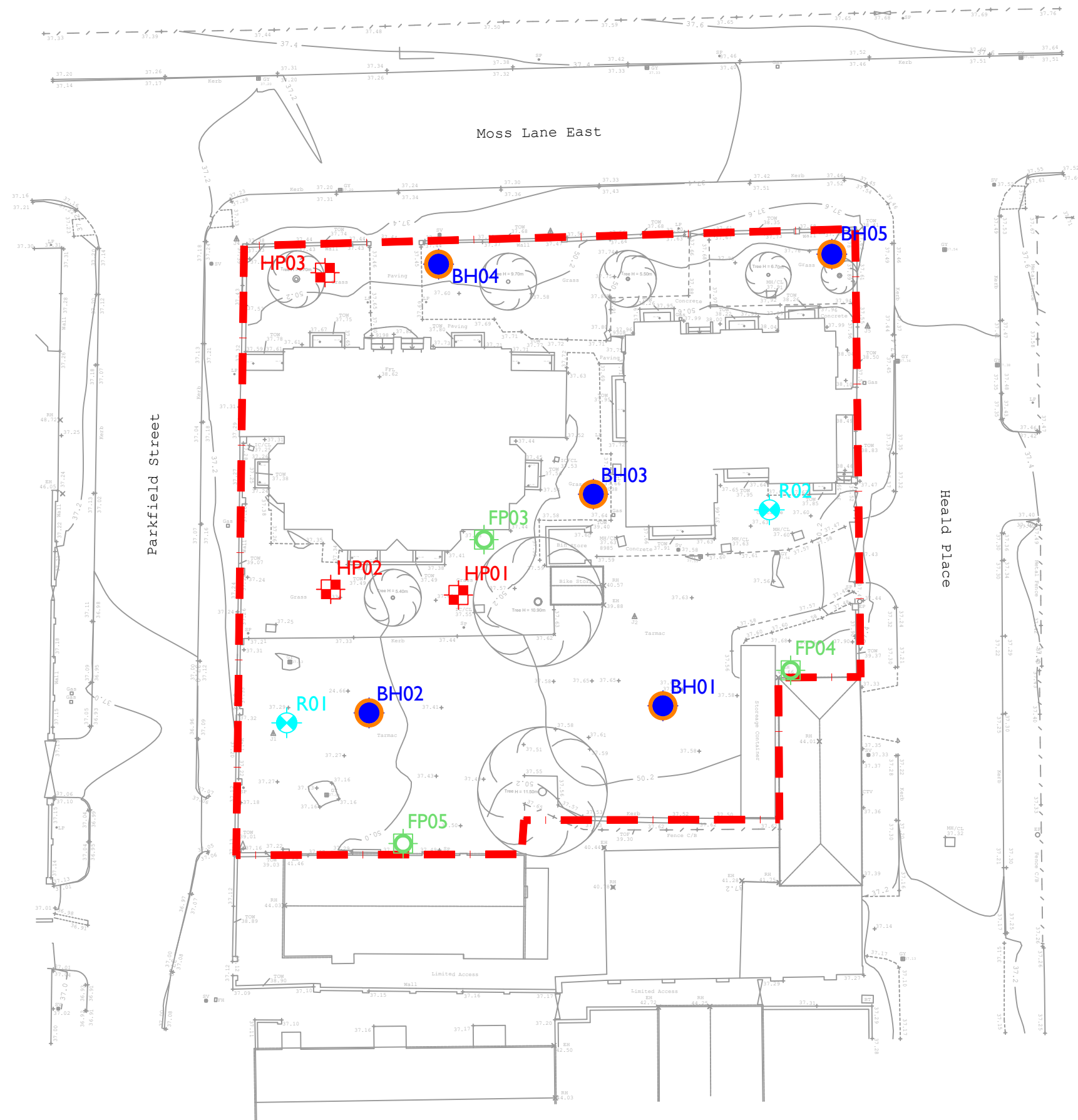
Hand Dug Pits (February 2024)	5 No. hand pits (HP01 to HP03 and FP04 to FP05) were excavated using hand tools, extended to depths of 1.20 m bgl and logged by a competent field geologist. Logs are included in Appendix 06.
Soil Boreholes (February 2024)	5 No. soil boreholes (BH01 – BH05) were sunk from ground level to depths of up to 8.50 m bgl. Gas and groundwater monitoring wells were installed in each borehole. Logs are included in Appendix 07.
Rotary Boreholes (March 2024)	2 No. rotary boreholes (R01 and R02) were sunk to depths of 18.00 m bgl to confirm the depth to rockhead and provide information on the underlying bedrock lithology. Logs are included in Appendix 08.
Chemical Testing	13 No. soil chemical samples, 7 No. leachate samples, 1 No. groundwater sample, 2 No. UKWIR samples and 2 No. WAC samples were tested for a comprehensive range of potential contaminants. Soil and water chemical analysis results are included in Appendix 09.
Groundwater / Gas Monitoring	6 No. ground gas / water monitoring visits have been undertaken at the site. Results are included in Appendix 10.
Geotechnical Testing	In-situ SPT tests were undertaken in all soil boreholes sunk on site. In addition, laboratory geotechnical analyses were undertaken on selected soil samples. Results are included in Appendix 11.

3.1.3 The exploratory holes were intended to provide geotechnical and hydrogeological data of site areas associated with the proposed development, and to facilitate soil, rock and water sampling (if available) for chemical contamination and geotechnical testing, where required.

3.1.4 Representative samples of the soils encountered were obtained and tested for an appropriate suite of testing including metals, hydrocarbons and asbestos, which was considered appropriate given the known historical site usage.

3.1.5 Exploratory hole locations are indicated on Drawing No. P23/483/SI/R/F/07.

- 3.1.6 Note that trial pits were not undertaken due access restrictions into the northern area plus due to the existing usage as a car park (to avoid disturbance for existing site users). Instead, a series of shallow hand dug pits were undertaken to facilitate for additional shallow soil sampling.
- 3.1.7 The co-ordinates and levels of each exploratory hole were surveyed in by GD Drilling Ltd.



NOTES

- Approximate site boundary
- HP01 to HP03 Hand pit excavated by GD Drilling Ltd (February 2024)
- BH01 to BH05 Soils bore sunk by GD Drilling Ltd (February 2024)
- R01 & R02 Rotary bore sunk by Teasdale Drilling Services Ltd (March 2024)
- FP03 to FP05 Foundation pit
- Ground gas / water monitoring well

REV	DATE	DETAILS
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GI 1TF

PROJECT TITLE

MOSS LANE EAST
MANCHESTER

DRAWING TITLE

EXPLORATORY HOLE
LOCATION PLAN

DRAWN BY	CHK'D BY	APP'D BY	DATE	SCALES
AC	SA	AMcG	29.04.24	Not to Scale
PROJECT No.	DRAWING No.	REVISION		
P23/483	P23/483/SI/R/F/07			

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3.2 Investigation Rationale

3.2.1 Our intrusive investigation has sought to be generally compliant with BS5930:2015 + A1:2020 and BS10175:2011 + A2:2017. We have implemented the following site practices:

- The drilling works have been undertaken by a suitably accredited sub-contractor;
- The geological succession at each exploratory hole location has been logged by an experienced field specialist and samples taken for laboratory analysis together with a visual assessment, made of geological character and potential contaminant impact if present.
- In selecting the appropriate samples for testing, we have taken cognisance of a number of factors, including the proposed site use. Sampling rationale has been determined in accordance with R&D Technical Report P5-066 / TR Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination, as indicated in the table below.

Table 08 – Sampling Strategy

Rationale for Sampling at Different Depths	
Depth Range	Rationale
Ground Level – 1.0 m	To assess: • Human/ animal intake arising from ingestion and dermal contact. • Potential for wind entrainment leading to inhalation (of contaminated soils and dusts) or deposition onto neighbouring land. • Surface water run-off (e.g. due to flash flooding). • Uptake by shallow rooting plants (e.g. crops, ornamental and wild species). • Surface leaching to groundwater.
>1.0 m in made or natural ground	To assess: • Intake via ingestion/ inhalation/ dermal contact arising from 'abnormal' (or unpredicted) excavation (e.g. children digging dens) or for other purposes such as swimming pools, ponds, house extensions. • Uptake by deep rooting shrubs or trees. • Intake by or arising from the activities of burrowing animals. • Intake arising from construction / maintenance of buildings and services, for example: a. Foundations (usually within 2.0 m of final formation level). b. Water supply pipes, telecommunications, gas and power (0.5 m to 1.0 m of final formation levels). c. Sewers (from 0.5 m to >1.0 m of final formation level). • To locate perched water of groundwater. • To confirm depth of made ground. • To locate possible lateral pathways for gas or vapour migration in made ground. • To establish the extent of any leaching of soluble constituents from superficial soils. • To detect 'deep' contamination (e.g. gas generating materials, leachable materials, dense solvents located above an impermeable stratum). • To obtain information on 'background' soil properties. • To locate 'natural' lateral migration pathways.

- The scope of the testing implemented considered the interpreted origin of the materials in association with their description. This is consistent with best practice under current contaminated land guidance. The chemical condition of these materials was assessed for a wide spectrum of potential contaminants, comprising a broad range of common organic and inorganic substances primarily of a toxic or phytotoxic nature.
- During sample collection, relevant information such as notes of field observations has been logged before transferring the samples to laboratory-prepared sample containers of appropriate type. Care was also taken to minimise the aeration of samples during transfer to the containers.

- 3.2.2 At the generic assessment stage it should be assumed that all pathways, contained within the generic model applied, will be active. In reality, unless a contaminant is volatile (e.g. organic), exposure by direct contact is likely to be mitigated by the depth of the contaminant or available surface cover. Generally, direct contact with contaminants at greater than 600 mm depth, or under hardstanding is highly unlikely to occur, unless the ground is to be disturbed through removal of surfacing or earthworks.

Groundwater Purging

- 3.2.3 All purging of groundwater was undertaken using 1 m long plastic bailers. However, due to insufficient recharge recorded within the majority of the wells, only one groundwater sample was able to be retrieved (further discussed in section 4.6).

4.0 INVESTIGATION RESULTS

4.1 Ground Conditions

- 4.1.1 The ground conditions recorded during the investigations were consistent with the anticipated sequence of strata. The soils were noted to comprise MADE GROUND underlain by natural GLACIAL TILL, further underlain by sedimentary bedrock comprising heavily weathered SANDSTONE.

Table 09 – Summary of Ground Conditions

Strata Type	Depth Range (m bgl)	Visual Description
Surface cover (Topsoil or Tarmac)	0.00 – 0.20	Grass over brown, sandy, gravelly topsoil with rootlets and fragments of burnt shale.
	0.00 – 0.60	Tarmac underlain by a granular sub-base described as greyish brown, sandy gravel with fragments of crushed aggregate, brick and burnt shale.
Made Ground	0.15 – 1.20	Soft, brown, sandy, gravelly clay with fragments, of brick, burnt shale, concrete and traces of ash.
Glacial Till	0.90 – 2.50	Firm, brown and grey mottled orange, slightly silty CLAY with occasional coal fragments and rare gravel (i.e. weathered clay)
	1.70 – 14.20	Stiff becoming very stiff, greyish brown, slightly silty, slightly gravelly CLAY (i.e. unweathered clay).
	8.10 – 12.10	Very dense, brown, slightly silty, very gravelly, fine to coarse SAND.
Sedimentary Bedrock	13.20 – 14.20 (rockhead depths)	Heavily weathered red SANDSTONE.

4.2 Strata Encountered

Surface Covering

- 4.2.1 The northern site area was surfaced in grass which was immediately underlain by brown, sandy, gravelly topsoil with rootlets and fragments of burnt shale, proven to between 0.15 m and 0.20 m thick.
- 4.2.2 The southern site area was surfaced in tarmac (0.10 m thick) underlain by a granular sub-base (0.30 m to 0.50 m thick) described as greyish brown, sandy gravel with fragments of crushed aggregate, brick and burnt shale.

Made Ground

- 4.2.3 MADE GROUND deposits were encountered from the base of the surface covering, described as soft, brown, sandy, gravelly clay with fragments, of brick, burnt shale, concrete and traces of ash, proven to between 0.90 m and 1.20 m bgl.

- 4.2.4 The recorded made ground thicknesses are indicated on Drawing No. P23/483/SI/R/F/08.

Glacial Till

- 4.2.5 Encountered from the base of the made ground, described as firm, brown and grey mottled orange, slightly silty CLAY with occasional coal fragments and rare gravel (i.e. weathered clay), proven to between 1.70 m and 2.50 m bgl, underlain by stiff becoming very stiff, greyish brown, slightly silty, slightly gravelly CLAY (i.e. unweathered clay), proven to 14.20 m bgl. Note that a granular band was encountered between 8.10 m and 12.10 m depth described as very dense, brown, slightly silty, very gravelly, fine to coarse SAND.

- 4.2.6 The recorded depths to dense / stiff (or better) natural subsoils are indicated on Drawing No. P23/483/SI/R/F/09.

Rockhead

- 4.2.7 Sedimentary bedrock was encountered at rockhead depths of between 13.20 m and 14.20 m bgl (23.00 mAOD to 24.30 mAOD), described as heavily weathered red SANDSTONE.

- 4.2.8 Due to the heavily weathered nature of the bedrock, no core recovery (within 6 m of rockhead) was able to be retrieved.

- 4.2.9 The recorded depths and levels to rockhead are indicated in Drawing No. P23/483/SI/R/F/10.

4.3 Visual / Olfactory Evidence of Contamination

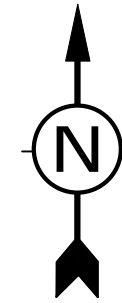
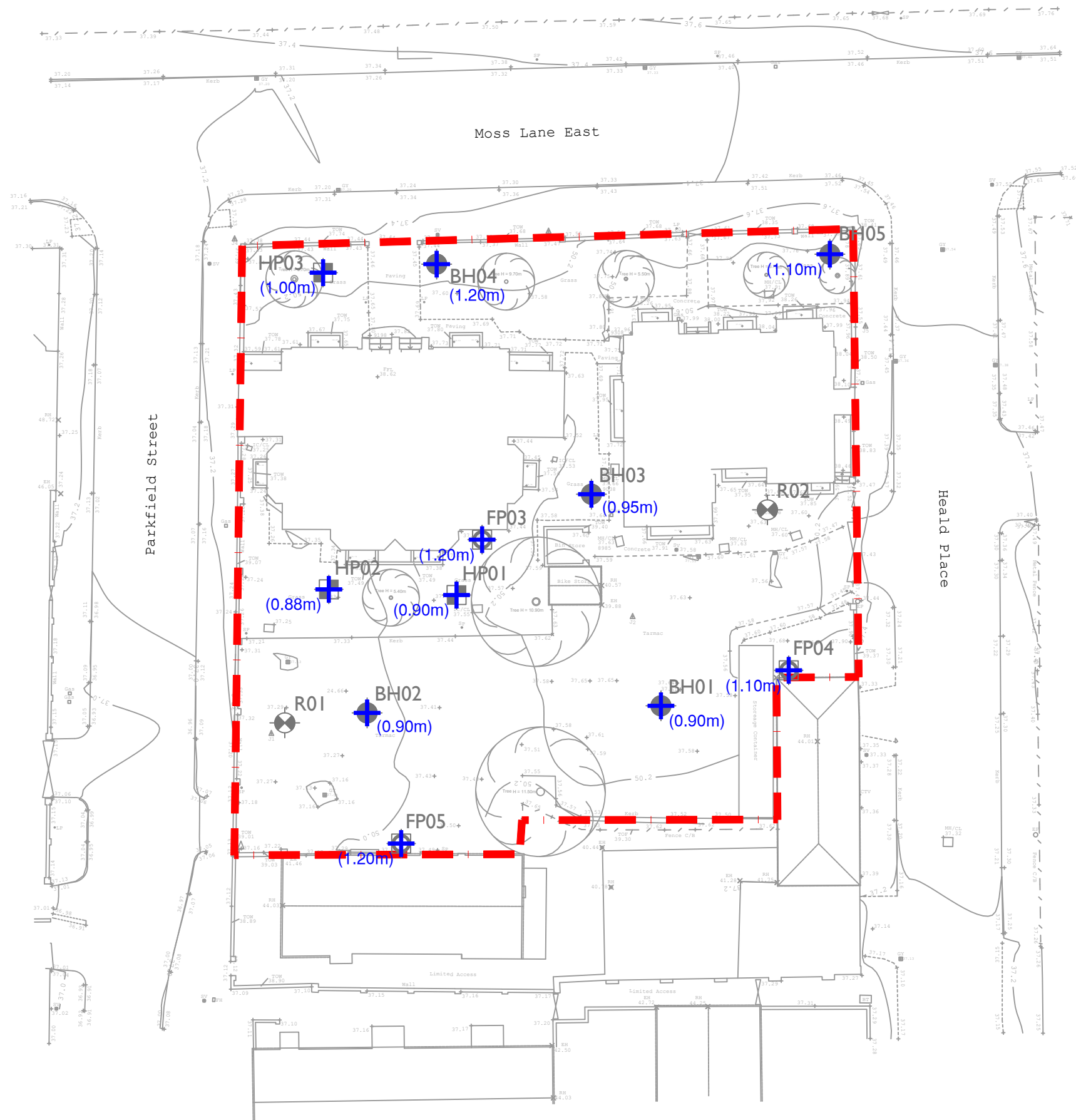
- 4.3.1 No obvious visual or olfactory evidence of contamination (e.g. hydrocarbons) was recorded within the soils below the site.

4.4 Obstructions

- 4.4.1 No evidence of any obstructions (such as former floor slabs) was recorded during our investigations. However, vigilance should be maintained for such features during future development works.

4.5 Side Wall Stability

- 4.5.1 Since our ground investigations consisted of soil bores and not trial pits, the side wall stability is currently unknown. However, given the ground conditions recorded (i.e. firm to stiff natural CLAY from shallow depth) we would not envisage the side walls to pose any significant collapsing risk. However, this will still need to be confirmed as part of any future excavation works.



NOTES

- Approximate site boundary
- HP01 to HP03 Hand pit excavated by GD Drilling Ltd (February 2024)
- BH01 to BH05 Soils bore sunk by GD Drilling Ltd (February 2024)
- R01 & R02 Rotary bore sunk by Teasdale Drilling Services Ltd (March 2024)
- FP03 to FP05 Foundation pit
- (0.90m) Recorded made ground thickness (m)

REV	DATE	DETAILS
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PROJECT TITLE

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MANCHESTER

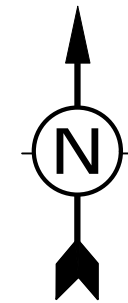
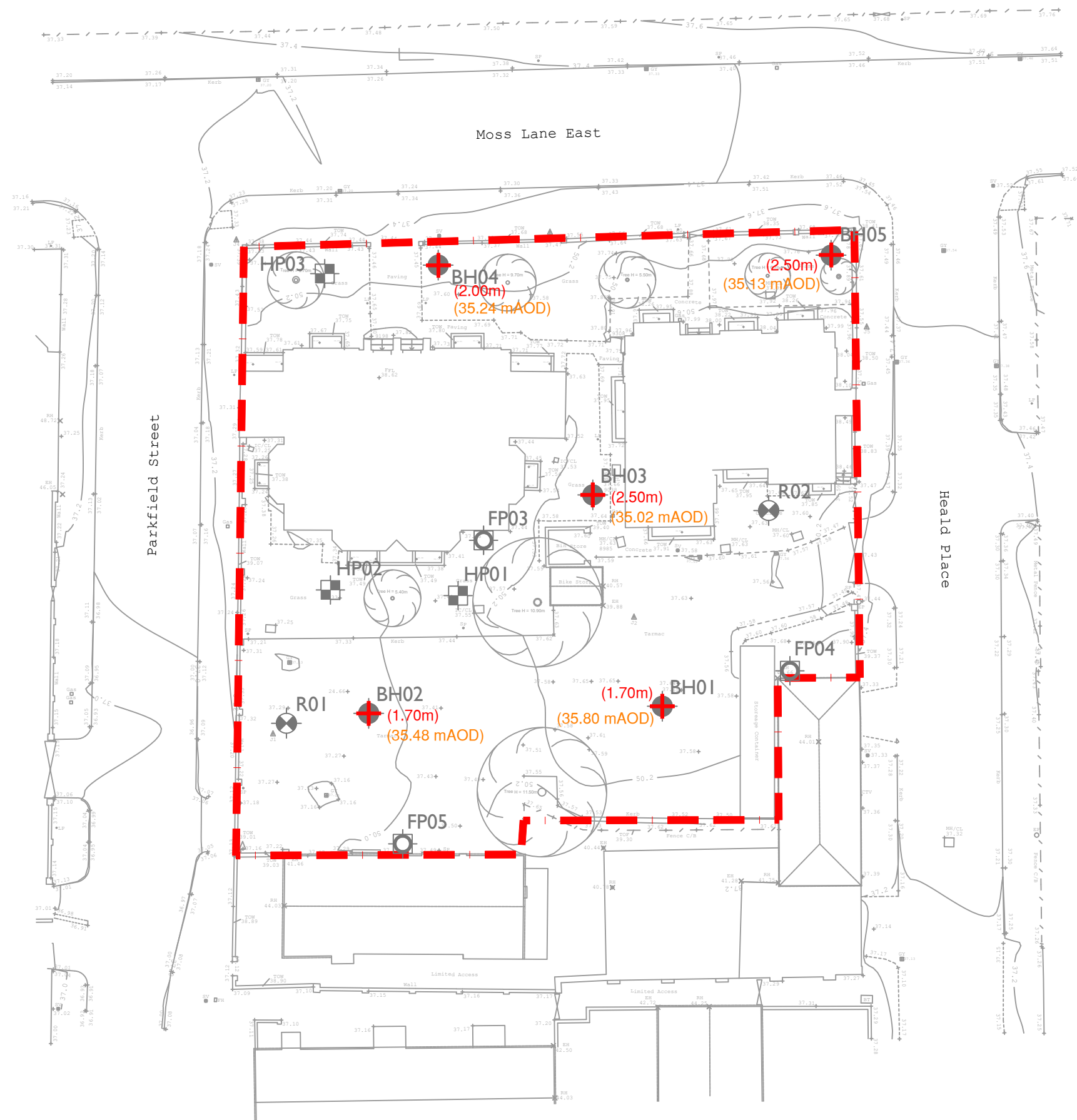
DRAWING TITLE

RECORDED MADE GROUND
THICKNESS

DRAWN BY AC	CHK'D BY SA	APP'D BY AMcG	DATE 29.04.24	SCALES Not to Scale
PROJECT No. P23/483	DRAWING No. P23/483/SI/R/F/08	REVISION		

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NOTES

- Approximate site boundary
- HP01 to HP03
Hand pit excavated by
GD Drilling Ltd (February 2024)
- BH01 to BH05
Soils bore sunk by
GD Drilling Ltd (February 2024)
- R01 & R02
Rotary bore sunk by
Teasdale Drilling Services Ltd (March 2024)
- FP03 to FP05
Foundation pit
- (1.70m)
(35.80 mAOD)
Recorded depth and level to stiff
(or better) natural soils

REV	DATE	DETAILS
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WILL RUDD DAVIDSON (GLASGOW) Ltd
100 BRUNSWICK STREET
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GI 1TF

PROJECT TITLE

MOSS LANE EAST
MANCHESTER

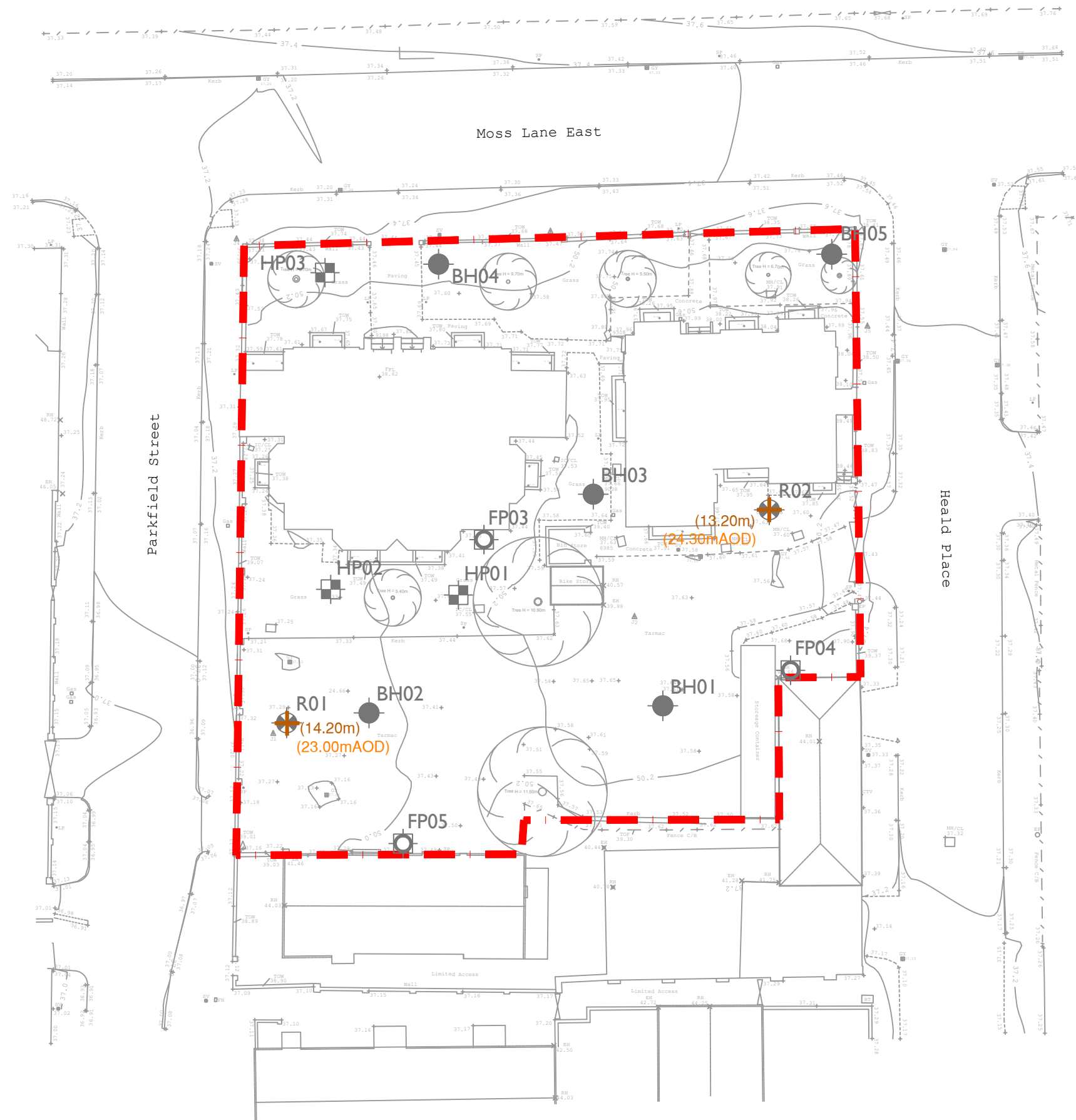
DRAWING TITLE

RECORDED DEPTH AND LEVEL TO
STIFF (OR BETTER) NATURAL SOILS

DRAWN BY	CHK'D BY	APP'D BY	DATE	SCALES
AC	SA	AMcG	29.04.24	Not to Scale
PROJECT No.	DRAWING No.	REVISION		
P23/483	P23/483/SI/R/F/09			

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4.6 Groundwater

4.6.1 During site works, groundwater ingress was encountered within two out of the five boreholes (BH03 and BH04). The water ingress was described as 'seepage' and was recorded at 1.00 m depth bgl.

4.6.2 To provide a more accurate assessment of groundwater behaviour, monitoring wells were installed within each borehole.

4.6.3 Groundwater monitoring has been undertaken at the site on 6 No. occasions (results included in Appendix 10). The results of the groundwater depth monitoring are summarised in Table 10 below.

Table 10 – Summary of Groundwater Monitoring Results

Location	Minimum Depth (m bgl)	Maximum Depth (m bgl)	Minimum Level (mAOD)	Maximum Level (mAOD)	Depth of Well (m bgl)	Well Level at Base (mAOD)	Recharge
BH01	1.15	1.40	36.35	36.10	7.70	29.80	No
BH02	7.60	Dry	29.58	29.03	8.15	29.03	No
BH03	0.90	2.30	36.63	35.23	4.20	33.33	No
BH04	0.75	1.00	36.49	36.24	3.40	33.84	No
BH05	1.55	Damp	36.08	34.73	2.90	34.73	No

4.6.4 The information obtained during site works and from the well monitoring (i.e. inconsistent water strikes with generally no significant recharge recorded during purging) plus the presence of cohesive glacial soils (which recorded a high fines content of up to 94% and would unlikely be susceptible to lateral groundwater migration) indicated that a pervasive groundwater table does not exist within the shallow soils.

4.6.5 However, pockets of groundwater do exist, though these are considered to be localised and perched, likely as a result of surface water infiltration and not representative of a pervasive body.

5.0 CONTAMINATION RISK ASSESSMENT

5.1 Human Health and Groundwater Risk Assessment Screening Criteria

5.1.1 Consideration of analytical results against applicable, conservative risk-based screening criteria has been used to provide an assessment of risk. A tiered risk-based approach comprises:

- Preliminary Risk Assessment (e.g. establishing potential pollutant linkages);
- Generic Quantitative Risk Assessment (GQRA) (e.g. the comparison of contaminant concentrations against Soil Guideline Values (SGV) or other Generic Assessment Criteria (GAC)); and
- Detailed Quantitative Risk Assessment (DQRA) (e.g. the comparison of contaminant concentrations against site specific assessment criteria).

5.1.2 A GQRA has been carried out as part of this assessment. Soil chemical analysis data has been assessed in terms of risks to human health and vegetation while leachate data has been assessed in terms of risks to the water environment. The GACs utilised are the published Suitable 4 Use Levels (S4ULs) derived by LQM/CIEH, based on the exposure parameters, outlined in the DEFRA publication SPI010 (Category 4 Screening Levels (C4SLs) (March 2014). The S4ULs are derived in accordance with current UK legislation, and national policy using the most recent version of the CLEA software (v1.06). Normally the CLEA software utilises the default exposure pathways and land use assumptions outlined in SR3 (Environment Agency 2009b).

5.1.3 The derived S4ULs are based on the concept of minimal tolerable risk as described in SR2 (Environment Agency 2009a) which underpins all previous EA SGVs and other GACs. Please note that S4ULs do not incorporate any toxicological parameter changes to the CLEA base model, however recent toxicological data has been incorporated into the contaminant databases. Furthermore, S4UL GACs are considered to be equivalent to the previously published Environment agency SGVs, and previous iterations of LQM/CIEH GACs and as such are suitable for use in generic quantitative risk assessments under both planning and Part IIa regimes.

5.1.4 In this case we have utilised S4UL values appropriate to a 'residential without gardens' end-use, with an average soil organic matter (SOM) concentration 6.0% (average of 7.16% recorded).

5.2 Statistical Analysis of Data

5.2.1 Where appropriate, chemical data for soils can be considered statistically in general accordance with the guidelines given in the Chartered Institute of Environmental Health Publication *Guidance on comparing Soil Contamination Data with a Critical Concentration* (May 2008).

5.2.2 For this project, statistical analysis has not been required.

Sample Depths

- 5.2.3 At the generic assessment stage, it should be assumed that all pathways contained within the generic model applied will be active. In reality, unless a contaminant is volatile (e.g. organic), exposure by direct contact will likely be mitigated by the depth of the contaminant or available surface cover. Generally, direct contact with contaminants at greater than 600 mm depth or under hardstanding is highly unlikely to occur unless the ground is to be disturbed through removal of surfacing or earthworks.

5.3 Ground / Mine Gas Assessment

- 5.3.1 The potential presence of carbon dioxide and methane at the target site have been appraised in compliance with CIRIA document, *Assessing Risks Posed by Hazardous Gases to Buildings (Report C665)* and BS 8485, *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (June 2015)*. In addition, a recent CL:AIRE publication entitled; 'Good Practice for Risk Assessment for Coal Mine Gas Emissions, dated October 2021' has also been consulted during our assessment, with reference made to the 'Design Support Tool for Mine Gas Risk Assessment'. These documents detail site investigations methodologies and risk assessment procedures for assessing the results from such investigations.

5.4 Building Materials Assessment

- 5.4.1 BRE Special Digest I 'Concrete in Aggressive Ground' (3rd Edition, 2005) has been used to determine an appropriate concrete class for the development.

6.0 HUMAN HEALTH RISK ASSESSMENT

6.1 Contaminants in Soils

6.1.1 13 No. samples of the shallow soils were retrieved from the (0.18 Ha) site and analysed for a range of metals, hydrocarbons and asbestos contaminants. The laboratory test certificates are included in Appendix 09. An overview of the results is shown in Table 11 below.

Table 11 – Exceedance of Guideline Levels (Residential without Gardens)

Contaminant	Effect	Measured Concentrations in Excess of SGV/GSV/SSTL (mg/kg)		Measured Exceedance Concentrations (mg/kg)		SGV/GSV/ SSV (mg/kg)	Source
		Made Ground	Natural	Made Ground	Natural		
Metals							
Arsenic	Toxic	0 of 10	0 of 3	-	-	40	LQM/CIEH S4ULs (2015)
Boron	Toxic	0 of 10	0 of 3	-	-	11,000	LQM/CIEH S4ULs (2015)
Cadmium	Toxic	0 of 10	0 of 3	-	-	85	LQM/CIEH S4ULs (2015)
Chromium III	Toxic	0 of 10	0 of 3	-	-	910	LQM/CIEH S4ULs (2015)
Chromium VI	Toxic	0 of 10	0 of 3	-	-	6	LQM/CIEH S4ULs (2015)
Copper	Toxic	0 of 10	0 of 3	-	-	7100	LQM/CIEH S4ULs (2015)
Lead	Toxic	6 of 10	1 of 3	490 (FP03) 1200 (HP02) 360 (BH01) 360 (BH02) 380 (BH03) 490 (BH04)	320 (BH01)	300	C4SL (DEFRA SP1010) (2014)
Mercury (Inorganic)	Toxic	0 of 10	0 of 3	-	-	56	LQM/CIEH S4ULs (2015)
Nickel	Toxic	0 of 10	0 of 3	-	-	180	LQM/CIEH S4ULs (2015)
Selenium	Toxic	0 of 10	0 of 3	-	-	430	LQM/CIEH S4ULs(2015)
Zinc	Toxic	0 of 10	0 of 3	-	-	40,000	LQM/CIEH S4ULs (2015)
Phenol	Toxic	0 of 10	0 of 3	-	-	1200	LQM/CIEH S4ULs (2015)
Petroleum Hydrocarbons							
Aliphatic C5-C6	Toxic	0 of 10	0 of 3	-	-	160	LQM/CIEH S4ULs (2015)
Aliphatic C6-C8	Toxic	0 of 10	0 of 3	-	-	530	LQM/CIEH S4ULs (2015)
Aliphatic C8-C10	Toxic	0 of 10	0 of 3	-	-	150	LQM/CIEH S4ULs (2015)
Aliphatic C10-C12	Toxic	0 of 10	0 of 3	-	-	770	LQM/CIEH S4ULs (2015)
Aliphatic C12-C16	Toxic	0 of 10	0 of 3	-	-	4400	LQM/CIEH S4ULs (2015)
Aliphatic C16-C21	Toxic	0 of 10	0 of 3	-	-	110,000	LQM/CIEH S4ULs (2015)
Aliphatic C16-C35	Toxic	0 of 10	0 of 3	-	-	110,000	LQM/CIEH S4ULs (2015)
Aliphatic C21-C35	Toxic	0 of 10	0 of 3	-	-	110,000	LQM/CIEH S4ULs (2015)
Aromatic C5-C7	Toxic	0 of 10	0 of 3	-	-	1400	LQM/CIEH S4ULs (2015)
Aromatic C7-C8	Toxic	0 of 10	0 of 3	-	-	3900	LQM/CIEH S4ULs (2015)
Aromatic C8-C10	Toxic	0 of 10	0 of 3	-	-	270	LQM/CIEH S4ULs (2015)
Aromatic C10-C12	Toxic	0 of 10	0 of 3	-	-	1200	LQM/CIEH S4ULs (2015)
Aromatic C12-C16	Toxic	0 of 10	0 of 3	-	-	2500	LQM/CIEH S4ULs (2015)
Aromatic C16-C21	Toxic	0 of 10	0 of 3	-	-	1900	LQM/CIEH S4ULs (2015)
Aromatic C21-C35	Toxic	0 of 10	0 of 3	-	-	1900	LQM/CIEH S4ULs (2015)
PAHs							
Naphthalene	Toxic	0 of 10	0 of 3	-	-	13	LQM/CIEH S4ULs (2015)
Acenaphthylene	Toxic	0 of 10	0 of 3	-	-	6000	LQM/CIEH S4ULs (2015)
Acenaphthene	Toxic	0 of 10	0 of 3	-	-	6000	LQM/CIEH S4ULs (2015)
Fluorene	Toxic	0 of 10	0 of 3	-	-	4500	LQM/CIEH S4ULs (2015)
Phenanthrene	Toxic	0 of 10	0 of 3	-	-	1500	LQM/CIEH S4ULs (2015)
Anthracene	Toxic	0 of 10	0 of 3	-	-	37,000	LQM/CIEH S4ULs (2015)
Fluoranthene	Toxic	0 of 10	0 of 3	-	-	1600	LQM/CIEH S4ULs (2015)
Pyrene	Toxic	0 of 10	0 of 3	-	-	3800	LQM/CIEH S4ULs (2015)
Benzo(a)anthracene	Toxic	0 of 10	0 of 3	-	-	15	LQM/CIEH S4ULs (2015)
Chrysene	Toxic	0 of 10	0 of 3	-	-	32	LQM/CIEH S4ULs (2015)
Benzo(b)fluoranthene	Toxic	0 of 10	0 of 3	-	-	4.0	LQM/CIEH S4ULs (2015)
Benzo(k)fluoranthene	Toxic	0 of 10	0 of 3	-	-	110	LQM/CIEH S4ULs (2015)
Benzo(a)pyrene	Toxic	2 of 10	0 of 3	5.4 (BH01) 4.4 (BH05)	-	3.2	LQM/CIEH S4ULs (2015)

Indeno(1,2,3-c,d)pyrene	Toxic	0 of 10	0 of 3	-	-	46	LQM/CIEH S4ULs (2015)
Dibenzo(a,h)anthracene	Toxic	5 of 10	0 of 3	0.4 (FP05) 0.5 (BH01) 0.6 (BH04) 0.4 (BH04) 0.7 (BH05)	-	0.32	LQM/CIEH S4ULs (2015)
Benzo(g,h,i)perylene	Toxic	0 of 10	0 of 3	-	-	360	LQM/CIEH S4ULs (2015)
Other							
Asbestos	Toxic	3 of 10	0 of 3	<0.001% (FP05) 0.002% (BH01) 0.006% (BH04)	-	Detection	HSE

6.1.2 The GQRA identified elevated toxic metal (lead) and poly aromatic hydrocarbon (benzo(a)pyrene and dibenzo(a,h)anthracene) contaminants within the shallow made ground soils. Note that whilst one of the natural samples was recorded to have elevated lead concentrations, we consider this to be a result of cross-contamination from the overlying made ground and not representative of the natural subsoil below the site.

6.1.3 In addition, asbestos fibres were encountered within the shallow made ground deposits (within 30% of the samples) between 0.50 m and 1.00 m depth. Subsequent quantification analyses recorded the total mass percentage of asbestos to range between <0.001% and 0.006% (i.e. low).

6.1.4 As such, it is considered that the shallow made ground soils pose a toxic risk to human health (refer to recommended 'Mitigation Measures' in section 10.3 for further detail).

7.0 WATER ENVIRONMENT RISK ASSESSMENT

7.1 Water Environment Vulnerability

- 7.1.1 Based on the desk study researches, interpretation of the ground conditions following investigative works and the results from groundwater monitoring, we consider the main water environment receptors with regards to the site to be the deep bedrock groundwater.

7.2 Controlled Waters Assessment

- 7.2.1 The main objectives of the protection and remediation of groundwater under threat from land contamination are set out in the Environment Agency's Groundwater Protection: Principles and Practice (GP3) series of documents. When assessing risks to controlled waters the following need to be taken into consideration:

Where pollutants have not yet entered groundwater, all necessary and reasonable measures must be taken to:

- *Prevent the input of hazardous substances into groundwater;*
- *Limit the entry of other (non-hazardous) pollutants into groundwater so as to avoid pollution, and to avoid deterioration of the status of groundwater bodies or sustained, upward trends in pollutant concentration.*

Where hazardous substances or non-hazardous pollutants have already entered groundwater, the priority is to:

- *Minimise further entry of hazardous substances and non-hazardous pollutants into groundwater;*
- *Take necessary and reasonable measures to limit the pollution of groundwater or impact on the status of the groundwater body from the future expansion of a contaminant 'plume', if necessary by actively reducing its extent.*

- 7.2.2 As such, leachate (including metals, TPHs and PAHs) analysis was carried out on 7 No. soil samples collected from across the site to determine the risks posed, if any, by the on-site conditions (if any) to the water environment.

- 7.2.3 Additionally, 1 No. groundwater sample was able to be recovered from BH01. The groundwater sample was tested for a suite of analysis including metals, TPHs and PAHs, and the results are included in Appendix 09. Note that this sample was able to be retrieved as a result of perched static groundwater, sourced from surface water infiltration and not due to there being a shallow pervasive water table present.

- 7.2.4 All leachate and groundwater results have been compared to appropriate guideline values. As groundwater is considered a primary risk, Minimum Reporting Values (MRV) have been used as obtained from the Environmental Risk Assessment Framework, Environment Agency, April 2010. In the absence of an MRV we have reverted to UK Drinking Water Standards, then WHO (4th Edition, 2017) guidelines for drinking water quality, WHO: Petroleum Products in Drinking Water (2005) and finally in the absence of these guidelines we have reverted to the laboratory limits of detection.

- 7.2.5 A summary of the leachate and groundwater analyses results are summarised in Tables 12 and 13 overleaf.

Table 12 – Leachate Analysis Compared with Appropriate Water Quality Standards

Potential Contaminant	MRV (µg/l)	UK DWS (µg/l)	WHO (2017) (µg/l)	WHO (2005) (µg/l)	LOD (µg/l)	No of Samples Above Guidelines	Range of Concentrations which Exceeded Relevant Guidelines (µg/l)
Metals							
Arsenic	-	10	-	-	-	0 of 7	-
Boron	-	-	1,000	-	-	0 of 7	-
Cadmium	-	5.0	-	-	-	0 of 7	-
Chromium III	-	50	-	-	-	0 of 7	-
Copper	-	2,000	-	-	-	0 of 7	-
Lead	-	-	10	-	-	0 of 7	-
Mercury	1.0	-	-	-	-	0 of 7	-
Nickel	-	20	-	-	-	0 of 7	-
Selenium	-	10	-	-	-	0 of 7	-
Zinc	-	5,000	-	-	-	0 of 7	-
Sulphate	-	250,000	-	-	-	0 of 7	-
Total Petroleum Hydrocarbons (TPHs)							
Aliphatic C5-C6	-	-	-	15,000	-	0 of 7	-
Aliphatic C6-C8	-	-	-	15,000	-	0 of 7	-
Aliphatic C8-C10	-	-	-	300	-	0 of 7	-
Aliphatic C10-C12	-	-	-	300	-	0 of 7	-
Aliphatic C12-C16	-	-	-	300	-	0 of 7	-
Aliphatic C16-C21	-	-	-	300	-	0 of 7	-
Aliphatic C21-C35	-	-	-	300	-	0 of 7	-
Aromatic C5-C7	-	-	-	10+	-	0 of 7	-
Aromatic C7-C8	-	-	-	10+	-	0 of 7	-
Aromatic C8-C10	-	-	-	300+	-	0 of 7	-
Aromatic C10-C12	-	-	-	100	-	0 of 7	-
Aromatic C12-C16	-	-	-	100	-	0 of 7	-
Aromatic C16-C21	-	-	-	90	-	0 of 7	-
Aromatic C21-C35	-	-	-	90	-	0 of 7	-
PAHs							
Naphthalene	-	-	-	-	0.05	0 of 7	-
Acenaphthylene	-	-	-	-	0.01	0 of 7	-
Acenaphthene	-	-	-	-	0.01	0 of 7	-
Fluorene	-	-	-	-	0.01	0 of 7	-
Phenanthrene	-	-	-	-	0.01	4 of 7	0.06 (FP03) 0.06 (HP02) 0.03 (BH02) 0.03 (BH04)
Anthracene	-	-	-	-	0.01	2 of 7	0.02 (FP03) 0.02 (HP02)
Fluoranthene	-	0.1	-	-	-	0 of 7	-
Pyrene	-	-	-	-	0.01	4 of 7	0.09 (FP03) 0.10 (HP02) 0.03 (BH02) 0.07 (BH04)
Benzo(a)anthracene	-	-	-	-	0.01	4 of 7	0.03 (FP03) 0.04 (HP02) 0.02 (BH02) 0.03 (BH04)
Chrysene	-	-	-	-	0.01	4 of 7	0.05 (FP03) 0.06 (HP02) 0.02 (BH02) 0.03 (BH04)
Benzo(b)fluoranthene	-	0.1	-	-	-	0 of 7	-
Benzo(k)fluoranthene	-	0.1	-	-	-	0 of 7	-
Benzo(a)pyrene	-	-	-	-	0.01	4 of 7	0.05 (FP03) 0.05 (HP02) 0.02 (BH02) 0.03 (BH04)
Indeno(1,2,3-c,d)pyrene	-	-	-	-	0.01	4 of 7	0.07 (FP03) 0.07 (HP02) 0.03 (BH02) 0.04 (BH04)
Dibenzo(a,h)anthracene	-	-	-	-	0.01	0 of 7	-
Benzo(g,h,i)perylene	-	0.1	-	-	-	0 of 7	-

MRV – Minimum Reporting Value – Environmental Risk Assessment Framework, Environment Agency, April 2010.

DWS – Drinking Water Standards, WHO (2011) – WHO Guidelines for Water Quality (4th Edition, 2017), WHO (2005) – WHO Petroleum Products in Drinking Water (2005).

LOD – Laboratory Limits of Detection.

7.2.6 Utilising current guideline values, the leachate testing did not identify any elevated metal or TPH contaminants within the shallow soils.

7.2.7 However, there were some PAH contaminants (phenanthrene, anthracene, pyrene, benzo(a)anthracene, chrysene benzo(a)pyrene and indeno(1,2,3-c-d)pyrene) recorded to be very marginally (i.e. <0.1 µg/l) above the laboratory limit of detection (LoD) values. It should be noted that the LoD is not based on any toxicological data or risk-based standards, and highlighting exceedances of the LoD serves to highlight which values require further consideration only. We would therefore consider those contaminations not significantly exceeding the LoD to pose a low risk to the water environment.

Table 13 – Groundwater Analysis Compared with Appropriate Water Quality Standards

Potential Contaminant	MRV (µg/l)	UK DWS (µg/l)	WHO (2017) (µg/l)	WHO (2005) (µg/l)	LOD (µg/l)	No of Samples Above Guidelines	Range of Concentrations which Exceeded Relevant Guidelines (µg/l)
Metals							
Arsenic	-	10	-	-	-	0 of 1	-
Boron	-	-	1,000	-	-	0 of 1	-
Cadmium	-	5.0	-	-	-	0 of 1	-
Chromium III	-	50	-	-	-	0 of 1	-
Copper	-	2,000	-	-	-	0 of 1	-
Lead	-	-	10	-	-	0 of 1	-
Mercury	1.0	-	-	-	-	0 of 1	-
Nickel	-	20	-	-	-	0 of 1	-
Selenium	-	10	-	-	-	0 of 1	-
Zinc	-	5,000	-	-	-	0 of 1	-
Sulphate	-	250,000	-	-	-	0 of 1	-
Total Petroleum Hydrocarbons (TPHs)							
Aliphatic C5-C6	-	-	-	15,000	-	0 of 1	-
Aliphatic C6-C8	-	-	-	15,000	-	0 of 1	-
Aliphatic C8-C10	-	-	-	300	-	0 of 1	-
Aliphatic C10-C12	-	-	-	300	-	0 of 1	-
Aliphatic C12-C16	-	-	-	300	-	0 of 1	-
Aliphatic C16-C21	-	-	-	300	-	0 of 1	-
Aliphatic C21-C35	-	-	-	300	-	0 of 1	-
Aromatic C5-C7	-	-	-	10+	-	0 of 1	-
Aromatic C7-C8	-	-	-	10+	-	0 of 1	-
Aromatic C8-C10	-	-	-	300++	-	0 of 1	-
Aromatic C10-C12	-	-	-	100	-	0 of 1	-
Aromatic C12-C16	-	-	-	100	-	0 of 1	-
Aromatic C16-C21	-	-	-	90	-	0 of 1	-
Aromatic C21-C35	-	-	-	90	-	0 of 1	-
PAHs							
Naphthalene	-	-	-	-	0.05	1 of 1	0.06
Acenaphthylene	-	-	-	-	0.01	0 of 1	-
Acenaphthene	-	-	-	-	0.01	1 of 1	0.09
Fluorene	-	-	-	-	0.01	1 of 1	0.08
Phenanthrene	-	-	-	-	0.01	1 of 1	0.59
Anthracene	-	-	-	-	0.01	1 of 1	0.18
Fluoranthene	-	0.1	-	-	-	1 of 1	0.62
Pyrene	-	-	-	-	0.01	1 of 1	0.49
Benzo(a)anthracene	-	-	-	-	0.01	1 of 1	0.13
Chrysene	-	-	-	-	0.01	1 of 1	0.30
Benzo(b)fluoranthene	-	0.1	-	-	-	1 of 1	0.19
Benzo(k)fluoranthene	-	0.1	-	-	-	1 of 1	0.07
Benzo(a)pyrene	-	-	-	-	0.01	1 of 1	0.13
Indeno(1,2,3-c,d)pyrene	-	-	-	-	0.01	1 of 1	0.24
Dibenzo(a,h)anthracene	-	-	-	-	0.01	0 of 1	-
Benzo(g,h,i)perylene	-	0.1	-	-	-	1 of 1	0.19

MRV – Minimum Reporting Value – Environmental Risk Assessment Framework, Environment Agency, April 2010.

DWS – Drinking Water Standards, WHO (2011) – WHO Guidelines for Water Quality (4th Edition, 2017), WHO (2005) – WHO Petroleum Products in Drinking Water (2005).

LOD – Laboratory Limits of Detection.

7.2.8 The groundwater testing did not identify any elevated metal or TPH contaminants within the shallow soils.

7.2.9 However, there were PAH contaminants (naphthalene, acenaphthene, fluorene, phenanthrene, anthracene, pyrene, benzo(a)anthracene, chrysene benzo(a)pyrene, indeno(1,2,3-c-d)pyrene and benzo(g,h,i)perylene) recorded to be marginally exceeding the guideline / LoD values. Again, we would highlight that the exceedance of the LoD value merely confirms that the contaminant is above the detection limit but is not based on, nor indicative of any toxicological risk.

- 7.2.10 Given the exceedances recorded in the analyses, and as part of our sensitivity analyses which takes cognisance of the guidance document EA RMT: Hydrogeological Risk Assessment for Land Contamination, we have modelled to an assessment point of 250 m. This is due to the present land-use (i.e. a built-up commercial area with no abstraction wells recorded within a 2 km radius) it is considered that there would be no exploitation of the groundwater.
- 7.2.11 We have utilised Remedial Targets Methodology R&D P20 (v3.2) published by the Environment Agency in our assessment and a copy of the models are included in Appendix 12.
- 7.2.12 The model was run for the maximum elevated concentrations of naphthalene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene and benzo(g,h,i)perylene which were indicated to pose the highest risk of contamination to the groundwater environment. The results of the modelling are shown in Table 14 below.

Table 14 – Results of P20 Groundwater Modelling (RPV / MRV)

Contaminants	Max Elevated Contaminant Concentration (µg/l)	Target Value (µg/l)	Source	Final concentration (µg/l)	No. of Samples Above Assessment Levels following P20 modelling
Naphthalene	0.06	0.01	LoD	0.00	0 out of 1
Acenaphthene	0.09	0.01	LoD	0.00	0 out of 1
Fluorene	0.08	0.01	LoD	0.00	0 out of 1
Phenanthrene	0.59	0.01	LoD	0.00	0 out of 5
Anthracene	0.18	0.01	LoD	0.00	0 out of 3
Fluoranthene	0.62	0.1	RPV / MRV	0.00	0 out of 1
Pyrene	0.49	0.01	LoD	0.00	0 out of 5
Benzo(a)anthracene	0.13	0.01	LoD	0.00	0 out of 5
Chrysene	0.30	0.01	LoD	0.00	0 out of 5
Benzo(b)fluoranthene	0.19	0.1	RPV / MRV	0.00	0 out of 1
Benzo(k)fluoranthene	0.07	0.1	RPV / MRV	0.00	0 out of 1
Benzo(a)pyrene	0.13	0.01	LoD	0.00	0 out of 5
Indeno(1,2,3-c,d)pyrene	0.24	0.01	LoD	0.00	0 out of 5
Benzo(g,h,i)perylene	0.19	0.1	RPV / MRV	0.00	0 out of 1

- 7.2.13 Within each of the elevated contaminants modeled, the final concentrations of PAH's were below the recommended guidelines or laboratory limits of detection (i.e. target values). As such, we consider that these PAH contaminants are not adversely impacting the groundwater environment.

P20 Modelling Parameters

- 7.2.14 The table below presents justification for the input parameters used in our P20 modelling exercise undertaken for the groundwater and the values used are considered to be relevant to the site conditions encountered during our investigation works.

Table 15 – Justification of P20 Model Inputs

Input Parameters	Value	Source of Parameter Value	Justification
Level 3 Groundwater			
Initial contaminant concentration in groundwater at plume core	Variable	Groundwater Laboratory Test Results	Maximum recorded concentration of contaminant at the site
Half-life for degradation of contaminant in water.	Variable	Handbook of Environmental Degradation Rates <i>Howard et al (dated 2019)</i>	Reputable source of contaminant half-life information. High groundwater half-life utilised
Width of possible plume in aquifer at source	60 m	Site measurement	Maximum width of possible plume
Plume thickness at source	7.0 m	Assumed value	This represents 50% of the measured saturated aquifer thickness
Saturated aquifer thickness	14	Thickness of superficial recorded at the site	Maximum thickness of flooded superficial soils recorded across the site
Bulk density of aquifer materials	2.084 g/cm ³	MATtest certificate	Average value derived from soil geotechnical results
Effective porosity of aquifer	0.50	Freeze and Cherry (1979) Table 2.4	Average porosity within range for sandy clay soils
Hydraulic gradient	0.001	Calculation	Representative value used given the absence of a pervasive water body
Hydraulic conductivity of aquifer materials in which dilution occurs.	0.00000864 m/day	Freeze and Cherry (1979) Table 2.2 (10 ⁻³ cm/s converted to m/day)	Average hydraulic conductivity within range for sandy clay soils, as indicated by PSD Test results (section 11.2)
Organic carbon partition coefficient	Variable	Total Petroleum Hydrocarbon Working Group Series Volume 3 (1997)	Reputable source of information

8.0 GROUND / MINE GAS EMISSIONS

8.1 General

Ground Gas

8.1.1 A ground gas risk assessment has been undertaken to assess the risk associated with carbon dioxide, methane gas and radon, to new buildings and their users. The only identified potential source of ground gas below the site was the made ground (proven to between 0.90 m and 1.20 m thick) with total organic carbon values of locally up to 8.1%. As such, we considered it prudent to undertake ground gas monitoring to confirm (or otherwise) the presence of ground gas emissions below the site.

8.1.2 The assessment of risk due to ground gases has been further discussed in publications for CIRIA and BRE, which have indicated a number of 'characteristic situations' depending on the concentrations and flow rates of gas. This classification system has been further developed by Wilson and Card (1999), and Boyle and Witherington (2006) and a revised industry guidance has been provided within CIRIA Report C665 (2007).

Mine Gas

8.1.3 The recent CL:AIRE publication entitled; 'Good Practice for Risk Assessment for Coal Mine Gas Emissions, dated October 2021' has also been consulted during our assessment, with reference made to the 'Design Support Tool for Mine Gas Risk Assessment'.

8.1.4 In accordance with the preliminary assessment procedures outlined in Figure 13.1 CL:AIRE, October 2021, we have assessed the proposed development site as being within a 'no risk zone', given that the site was not located within a Coal Mining Reporting Area.

8.1.5 As such, we do not consider the site to be at risk of mine gas emissions.

8.2 Ground Gas – Results

8.2.1 Ground gas monitoring of the installations had been undertaken at the site on six occasions. The monitoring was undertaken using a portable gas meter and the data is presented overleaf.

8.2.2 The rationale for monitoring was adapted from CIRIA C665, assuming a low-risk development (i.e. commercial) with a moderate generation potential (which we have assessed based on BS8576, Figure 6). Based on this, monitoring would be required on six occasions, over a period of approximately 3 months.

8.2.3 Measurements were taken during over a variety of atmospheric conditions, **including periods of low atmospheric pressure**, with barometric pressures ranging from 998 to 1028 mb.

- Oxygen (O₂) concentrations were recorded to range from 11.1% to 20.7%.
- Carbon dioxide (CO₂) concentrations were recorded to range from 0.0% to 4.2% vol.
- Methane (CH₄) was consistently recorded to range between 0.0% to 1.6% vol.
- Steady state flow rates were recorded to be consistently 0.0 litres / hour over the monitoring period.

8.2.4 The location of the monitoring wells, and a summary of the results is included in Drawing No. P23/483/SI/R/F/08. The results of the gas monitoring are included in Appendix 10.

8.3 Ground Gas – Assessment

8.3.1 Gas Screening Values have been calculated in line with CIRIA 665 and BS 8485 (2015) guidance.

8.3.2 This is done by calculating a Q_{hg} for each monitoring point, for each monitoring event. Hazardous gas flow rate Q_{hg} (in l/h) is calculated using the following:

$$Q_{hg} = C_{hg} / 100 \times q$$

Where:

C_{hg} is the measured hazardous gas concentration (in percentage volume-by-volume).

q is the flow rate (in litres per hour) of combined gasses from the standpipe found by direct measurement.

8.3.3 Hazardous gas flow rates were calculated for each monitoring point during each event. A ‘worst-case’ scenario was realised on 8th May 2024, in BH01 where CO₂ was 4.2% and a gas flow rate of 0.1 l/hr was assumed (0.0 l/hr recorded). The resultant hazardous gas flow rate is therefore as follows:

$$Q_{hg} = 4.2 / 100 \times 0.1$$

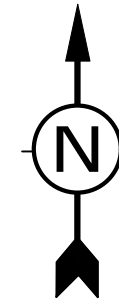
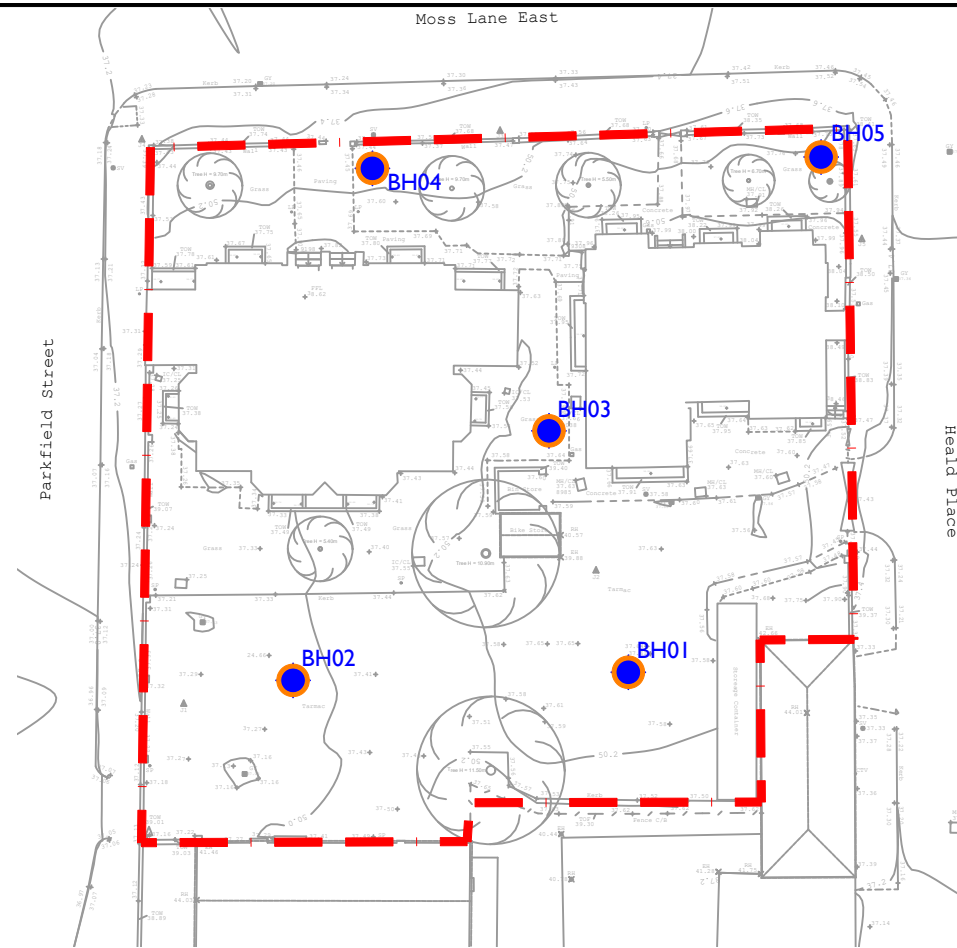
$$Q_{hg} = 0.0042$$

8.3.4 The value derived above is the highest hazardous gas flow rate calculated over the duration of the gas monitoring.

8.3.5 Based on the BS 8485 (2015) guidance, the calculated monitoring data and GSV corresponds to ‘Characterisation Situation 1’, where ground gas preclusion measures are not required, as outlined in Table 16 below.

Table 16 – Assessment of Gas Characterisation

Characteristic Situation	Hazard Potential	Gas Screening Value (GSV) (l/hr)	Additional Limiting Factors
1	Very Low	<0.07	Methane not to exceed 1% by volume and carbon dioxide not to exceed 5% by volume.
2	Low	0.07 to <0.7	Borehole air flow not to exceed 70 l/hr, otherwise increase to CS3.
3	Moderate	0.7 to <3.5	None
4	Moderate to High	3.5 to <15	None
5	High	15 to <70	None
6	Very High	>70	None



NOTES

Approximate site boundary

BH01 to BH05

Soils bore sunk by
GD Drilling Ltd (February 2024)

Ground gas / water monitoring well

Borehole BH01						
Date.	CH ₄ % Vol.	CO ₂ % Vol.	O ₂ % Vol.	Ave Flow (l/h)	Atmos. Pressure (mb)	G/Water Depth (m)
19.03.24	0.0	2.3	18.4	0.0	1011	1.40
01.04.24	0.0	1.8	19.3	0.0	998	Dry
11.04.24	0.0	0.7	19.9	0.0	1016	1.20
	0.0	0.3	21.2	0.2	1004	2.11
	0.0	0.0	20.3	0.2	1005	2.11
	0.0	0.2	21.2	-0.4	1010	2.05

Borehole BH02						
Date.	CH ₄ % Vol.	CO ₂ % Vol.	O ₂ % Vol.	Ave Flow (l/h)	Atmos. Pressure (mb)	G/Water Depth (m)
19.03.24	0.0	0.2	20.6	0.0	1011	Dry
01.04.24	0.0	0.6	19.3	0.0	998	Dry
11.04.24	0.0	0.5	19.9	0.0	1016	7.70
	0.0	0.3	21.2	0.2	1004	2.11
	0.0	0.0	20.3	0.2	1005	2.11
	0.0	0.2	21.2	-0.4	1010	2.05

Borehole BH03						
Date.	CH ₄ % Vol.	CO ₂ % Vol.	O ₂ % Vol.	Ave Flow (l/h)	Atmos. Pressure (mb)	G/Water Depth (m)
19.03.24	0.0	0.0	20.6	0.0	1011	1.10
01.04.24	0.0	0.0	19.0	0.0	998	Dry
11.04.24	0.0	0.2	20.4	0.0	1016	1.90
	0.0	0.3	21.2	0.2	1004	1.90
	0.0	0.0	20.3	0.2	1005	2.11
	0.0	0.2	21.2	-0.4	1010	2.05

Borehole BH04						
Date.	CH ₄ % Vol.	CO ₂ % Vol.	O ₂ % Vol.	Ave Flow (l/h)	Atmos. Pressure (mb)	G/Water Depth (m)
19.03.24	0.0	2.3	15.6	0.0	1011	0.90
01.04.24	0.0	2.2	12.3	0.0	998	0.75
11.04.24	0.0	0.1	17.9	0.0	1016	0.90
	0.0	0.3	21.2	0.2	1004	2.11
	0.0	0.0	20.3	0.2	1005	2.11
	0.0	0.2	21.2	-0.4	1010	2.05

Borehole BH05						
Date.	CH ₄ % Vol.	CO ₂ % Vol.	O ₂ % Vol.	Ave Flow (l/h)	Atmos. Pressure (mb)	G/Water Depth (m)
19.03.24	0.0	1.4	19.1	0.0	1011	1.90
01.04.24	0.0	1.5	19.1	0.0	998	1.55
11.04.24	0.0	1.5	19.1	0.0	1016	2.00
	0.0	0.3	21.2	0.2	1004	2.11
	0.0	0.0	20.3	0.2	1005	2.11
	0.0	0.2	21.2	-0.4	1010	2.05

REV

DATE

DETAILS

WILL RUDD DAVIDSON (GLASGOW) Ltd

100 BRUNSWICK STREET

GLASGOW

GI 1TF

PROJECT TITLE

MOSS LANE EAST
MANCHESTER

DRAWING TITLE

GROUND GAS
EMISSIONS SURVEY

DRAWN BY

AC

CHK'D BY

SA

APP'D BY

AMcG

DATE

29.04.24

SCALES

Not to
Scale

PROJECT No.

P23/483

DRAWING No.

P23/483/SI/R/F/11

REVISION

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8.3.6 The construction and use of the building, together with the control of future structural changes to the building and its maintenance (the building's management) should be assessed, since potential risks posed by ground gases are strongly influenced by these factors. The assessment should lead to the categorization of the building as a whole, or each different part of the building, into one of four building types: Type A, Type B, Type C or Type D, as outlined in Table 17 below.

8.3.7 New buildings should be categorized in accordance with Table 17, as outlined in BS 8485 (2015).

Table 17 – Building Types and Descriptions (BS 8485 – 2015)

Building Type	Description
A	Private ownership with no building management controls on alterations to the internal structure, the use of rooms, the ventilation of rooms or the structural fabric of the building. Some small rooms present. Probably conventional building construction (rather than civil engineering). Examples include private housing and some retail premises.
B	Private or commercial property with central building management control of any alterations to the building or its uses but limited or no central building management control of the maintenance of the building, including the gas protection measures. Multiple occupancy. Small to medium size rooms with passive ventilation of rooms and other internal spaces throughout ground floor and basement areas. May be conventional building or civil engineering construction. Examples include managed apartments, multiple occupancy offices, some retail premises and parts of some public buildings (such as schools, hospitals, leisure centers) and parts of hotels.
C	Commercial building with central building management control of any alterations to the building or its uses and central building management control of the maintenance of the building, including the gas protection measures. Single occupancy of ground floor and basement areas. Small to large size rooms with active ventilation or good passive ventilation of all rooms and other internal spaces throughout ground floor and basement areas. Probably civil engineering construction. Examples include offices, some retail premises, and parts of some public buildings (such as schools, hospitals, leisure centers and parts of hotels).
D	Industrial style building having large volume internal space(s) that are well ventilated. Corporate ownership with building management controls on alterations to the ground floor and basement areas of the building and on maintenance of ground gas protective measures. Probably civil engineering construction. Examples are retail park sales buildings, factory shop floor areas, warehouses. (Small rooms within these style buildings should be separately categorized as Type B or Type C).

8.3.8 From the identified Characteristic Situation and taking account of the proposed development, the minimum gas protection score should be calculated, in accordance with Table 18 below.

Table 18 – Gas Protection Score by Characteristic Situation and Type of Building

Characteristic Situation (CIRIA 149)	MINIMUM GAS PROTECTION SCORE (POINTS)			
	High Risk		Medium Risk	Low Risk
	Type A Building	Type B Building	Type C Building	Type D Building
1	0	0	0	0
2	3.5	3.5	2.5	1.5
3	4.5	4	3	2.5
4	6.5	5.5	4.5	3.5
5	-	6.5	5.5	4.5
6	-	-	7.5	6.5

8.3.9 As part of our gas risk assessment, we have also taken into consideration the effects of natural events (such as global warming) and on-site preferential pathways may have on the gaseous conditions below the site.

8.3.10 Whilst the foundation proposals are to consist of piles onto a suitable formation, the natural subsoils (approx. 14 m thick) recorded low organic-content (average of 1.13%), we do not consider that these deposits have the potential to generate any significant ground gas emissions in the future.

- 8.3.11 In addition, as discussed earlier in the report, the site is not underlain by mine workings within 100 m of existing levels, nor are there any records of mine gases in the area. As such, there is considered to be a low risk of future gas emissions being generated as a result of climate change or introducing piles into the soils / bedrock.
- 8.3.12 Furthermore, upon completion of the gas monitoring that each borehole well should be removed and appropriately backfilled in line with SEPA guidance prior to development, to limit any existing pathways existing where possible.
- 8.3.13 Finally, any future increase in groundwater levels or drops in atmospheric pressures should not pose any significant impact on gaseous conditions below the site. This was indicated during our gas monitoring visit on 01/04 which recorded low atmospheric pressure, yet still no evidence of significant steady state flow rates within the soil or harmful ground gas concentrations.
- 8.3.14 To conclude, from the site characteristic hazardous gas flow rate as calculated the ground gas regime was classified as 'Characterisation Situation 1'. Taking into account the building type (Type B – flatted residential development) this corresponded to a required solution score of 0, and as such ground gas preclusion measures are not deemed necessary.

8.4 **Instrument Calibration**

- 8.4.1 The calibration certificates for the gas monitoring instruments used throughout our monitoring visits are included in Appendix 13.

8.5 **Radon**

- 8.5.1 The Groundsure Report (refer to Appendix 02) stated that the site is located within a 'lower probability radon area' and therefore radon gas protective measures are not considered necessary in the construction of new developments.

9.0 RISKS TO CONSTRUCTED DEVELOPMENT

9.1 Sulphate Attack on Construction Materials

9.1.1 Laboratory testing was undertaken on selected soil samples, in order to determine the sulphate content and acidity, and hence the concrete class required for buried concrete.

9.1.2 We consider that a shallow water table does not exist below the site, and as such, any shallow groundwater encountered is considered to be static.

Table 19 – Sulphate and pH Summary

Determinant	Range	SDI DS Class	SDI ACEC Class
pH	6.3 – 11.1	DS-2	AC-Is
Total Sulphate as SO ₄ (%) in Soil	0.03 – 0.15%		
Sulphate as SO ₄ (%) in Groundwater	550 (mg/l)		

9.1.3 In accordance with BRE Special Digest '1:2005 Concrete in Aggressive Ground', our recommendation for concrete is 'Aggressive Chemical Environment' for Concrete (ACEC) Classification AC-Is with a design sulphate class for the site of DS-2.

9.2 Phytotoxicity

9.2.1 Guidance on the effects of metal contamination on plant growth is provided within the British Standard 'BS3882:2015 - Specification for Topsoil' and similar guidance issued by the Scottish Agricultural College (SAC). A summary of test results versus the recommended phytotoxic screening criteria is provided below:

Table 20 – Summary of Soil Results vs Phytotoxic Screening Criteria

Contaminant	Screening Value (mg/kg)	Measured Exceedance Concentrations (mg/kg)	Conc > BS 3882 Screening Value
Zinc	300	-	No
Copper	200	-	No
Nickel	110	-	No

Note – screening value based on average pH of >7.0 (ref BS3882:2015).

9.2.2 No exceedances of BS3882:2015 screening values for phytotoxic contaminants have been noted. As such, it is deemed that the shallow soils do not pose a phytotoxic risk to future vegetation. Full laboratory analysis results are included in Appendix 09.

9.3 Water Supply Pipes

9.3.1 UK Water Industry Research (UKWIR) document, 'Guidance for the Selection of Water Supply Pipes to be Laid in Brownfield Sites', ref 10/WM/03/21, states that on brownfield sites, MDPE/HDPE water supply pipes could be at risk from organic contaminants including mineral oils, VOC's and SVOC's, if the pipes are laid within 15 m of recorded contamination. Additionally, UKWIR states that where metallic pipes are being considered for use, conductivity, pH and redox state of the soil should be assessed to determine if the pipes are at risk of being corroded.

9.3.2 2 No. soil samples (taken from 1.00 m and 1.50 m depth) were sent for laboratory analysis. Testing was undertaken for the mandatory parameters outlined in the UKWIR guidance, to provide comment on the water supply pipe material most likely to be suitable for use within the site. The test results (included in Appendix 09) are summarised in the following tables:

Table 21 – UKWIR Test Results

Laboratory Name: DETS Ltd		Date: 15/03/2024 and 21/03/2024	Cert Nos. 24-04445 and 24-05723		
Group No.	Parameter Group	Depth: 1.00 m and 1.50 m bgl	Maximum Concentrations Detected		
		Units	Detection Limit	Concentration	Sample Code/ Hole
1	Extended VOC suite (with TIC)	mg/kg	0.01	<0.01	All samples
1a	• BTEX + MTBE	mg/kg	0.01	<0.01	All samples
2	Extended SVOC suite (with TIC)	mg/kg	0.01	<0.01	All samples
2e	• Phenols	mg/kg	0.1	<0.1	All samples
2f	• Cresols and chlorinated phenols	mg/kg	0.1	<0.1	All samples
3	Mineral Oils C11-C20	mg/kg	10	<10	All samples
4	Mineral Oils C20-C40	mg/kg	10	<10	All samples
5	Corrosive (Conductivity, Redox and pH)				
	Conductivity	µS/cm	1	2800 to 3300	All samples
	Redox Potential	mV	0.1	170 to 230	All samples
	pH	-	-	7.4 to 7.7	All samples
Specific suite if identified relevant					
2a	• Ethers	-	-	N/D	All samples
2b	• Nitrobenzene	-	-	N/D	All samples
2c	• Ketones	-	-	N/D	All samples
2d	• Aldehydes	-	-	N/D	All samples
6	Amines	-	-	N/D	All samples

*N/D – Not Detected

Table 22 – UKWIR Screening Guideline Values

Parameter Group		Pipe Material					
		All Threshold Concentrations are in mg/kg					
		PE	PVC	Barrier Pipe (PE-AI-PE)	Wrapped Steel	Wrapped Ductile Iron	Copper
1	Extended VOC suite by purge and trap or head space and GC-MS with TIC	0.5	0.125	Pass	Pass	Pass	Pass
1a	+ BTEX + MTBE	0.1	0.03	Pass	Pass	Pass	Pass
2	SVOCs TIC by purge and trap or head space and GC-MS with TIC (aliphatic and aromatic C5 – C10)	2	1.4	Pass	Pass	Pass	Pass
2e	+ Phenols	2	0.4	Pass	Pass	Pass	Pass
2f	+ Cresols and chlorinated phenols	2	0.04	Pass	Pass	Pass	Pass
3	Mineral oil C11-C20	10	Pass	Pass	Pass	Pass	Pass
4	Mineral oil C21-C40	500	Pass	Pass	Pass	Pass	Pass
5	Corrosive (Conductivity, Redox and pH)	Pass	Pass	Pass	Corrosive if pH < 7 and conductivity > 400µS/cm	Corrosive if pH < 5, Eh not neutral and conductivity > 400µS/cm	Corrosive if pH <5 or >8 and Eh positive
Specific suite identified as relevant following Site Investigation							
2a	Ethers	0.5	1	Pass	Pass	Pass	Pass
2b	Nitrobenzene	0.5	0.4	Pass	Pass	Pass	Pass
2c	Ketones	0.5	0.02	Pass	Pass	Pass	Pass
2d	Aldehydes	0.5	0.02	Pass	Pass	Pass	Pass
6	Amines	Detection	Pass	Pass	Pass	Pass	Pass

Table 23 – Pipe Material Selection

Parameter Group		Pipe Material					
		All Threshold Concentrations are in mg/kg					
		PE	PVC	Barrier Pipe (PE-AL-PE)	Wrapped Steel	Wrapped Ductile Iron	Copper
I	Extended VOC suite by purge and trap or head space and GC-MS with TIC	✓	✓	Pass	Pass	Pass	Pass
Ia	+ BTEX + MTBE	✓	✓	Pass	Pass	Pass	Pass
2	SVOCs TIC by purge and trap or head space and GC-MS with TIC (aliphatic and aromatic C5 – C10)	✓	✓	Pass	Pass	Pass	Pass
2e	+ Phenols	✓	✓	Pass	Pass	Pass	Pass
2f	+ Cresols and chlorinated phenols	✓	✓	Pass	Pass	Pass	Pass
3	Mineral oil C11-C20	✓	Pass	Pass	Pass	Pass	Pass
4	Mineral oil C21-C40	✓	Pass	Pass	Pass	Pass	Pass
5	Corrosive (Conductivity, Redox and pH)	Pass	Pass	Pass	✓	✓	✓
2a	Ethers	✓	✓	Pass	Pass	Pass	Pass
2b	Nitrobenzene	✓	✓	Pass	Pass	Pass	Pass
2c	Ketones	✓	✓	Pass	Pass	Pass	Pass
2d	Aldehydes	✓	✓	Pass	Pass	Pass	Pass
6	Amines	✓	✓	Pass	Pass	Pass	Pass
	Pipes that pass chemical thresholds	✓	✓	✓	✓	✓	✓

9.3.3 Given the recorded ground conditions (i.e. no evidence of any significant hydrocarbons) and results from the UKWIR analyses (which did not record any exceedances), we consider that that plastic (polyethylene) water supply pipes would be suitable for use within the site.

9.3.4 Due to the presence of (albeit low quantity) asbestos fibres, all future water supply pipes should be laid in widened trenches (approximately 1.00 m wide) and backfilled with clean, inert material.

10.0 REVISED CONCEPTUAL SITE MODEL

10.1 Contamination Sources / Receptors

Human Health:	The GQRA has identified toxic exceedance of metals, PAHs and asbestos contaminants within the shallow made ground soils which pose a potential risk to human health.
Plant Life:	No exceedances of BS3882:2015 screening values for phytotoxic contaminants have been noted. As such, we do not consider the shallow soils to pose a phytotoxic risk to future vegetation.
Water Environment:	We conclude that the shallow soils underlying the site do not pose a risk to the water environment.
Ground Gas:	Gas monitoring and risk assessment indicated that the ground gas regime conforms to 'Characteristic Situation 1', and as such, gas protection measures are not deemed necessary. Radon preclusion measures are not required.
Built Environment:	Representative samples analysed for pH and sulphate indicate ACEC Classification AC-1s with a design sulphate class for the site of DS-2. Based on the recorded ground conditions and results from the UKWIR analyses, we would consider plastic (polyethylene) water supply pipes to be a suitable option.

10.2 Pollutant Linkage Assessment

- 10.2.1 Based on the environmental investigation results and interpretations, our revised conceptual site model is indicated on Drawing No. P23/483/SI/R/F/11.

10.3 Mitigation Measures

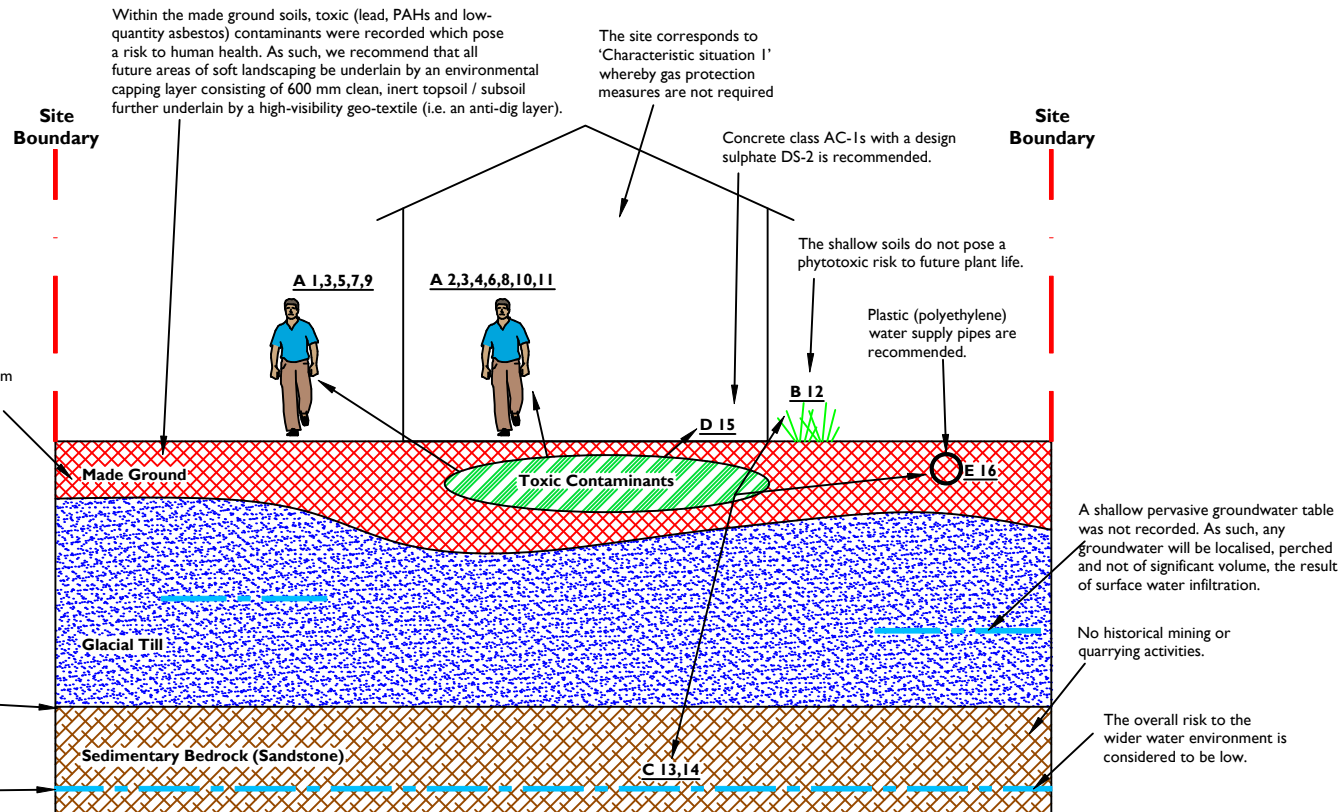
Human Health and Plant Life

- 10.3.1 Due to the presence of toxic contaminant exceedances within the shallow made ground soils, we recommend that all future areas of soft landscaping (underlain by made ground materials) should be underlain by an environmental capping layer consisting of 600 mm clean, inert topsoil / subsoil further underlain by a high-visibility geotextile (i.e. an anti-dig layer).

- 10.3.2 The shallow soils do not pose a phytotoxic risk to future plant life.

The Water Environment

- 10.3.3 Based on results from soil leachate and groundwater analyses plus our detailed risk assessment, it was concluded that the shallow soils do not pose a risk to the wider water environment (with the most sensitive receptor considered to be the deep bedrock groundwater).



Source

- Made ground (containing toxic contaminants).

Exposure Pathways

- Outdoor ingestion of dust.
- Indoor ingestion of dust.
- Consumption of homegrown vegetables.
- Ingestion of soil attached to vegetables.
- Skin contact with outdoor soil.
- Skin contact with indoor dust.
- Outdoor inhalation of dust.
- Indoor inhalation of dust.
- Outdoor inhalation of soil vapour.
- Indoor inhalation of soil vapour.
- Inhalation of ground gases.
- Contaminant uptake by vegetation.
- Leaching of contaminants to the groundwater.
- Contaminant migration in the groundwater.
- Detrimental effects on buried concrete.
- Permeation of plastic water supply pipes.

Receptors

- Site users / construction personnel.
- Vegetation / fauna.
- Groundwater.
- Buried concrete (Service and foundations)
- Plastic water supply pipes.

NOTES

- Due to the recorded toxic contamination within the shallow made ground soils, prior to any works starting, a detailed method statement and risk assessment should be implemented to mitigate the risk of toxic contaminants to future groundworkers. This should include the use of appropriately qualified personnel for the task, the use of appropriate PPE, the provision of on-site washing facilities and maintenance of a high standard of basic hygiene, plus a non-smoking and eating policy within the working area, with designated clean areas set aside for these activities.
- Our site walkover survey did not identify the presence of any non-native invasive plant species within the site. However, we would recommend that a specialist survey be undertaken during the growing season to confirm (or otherwise).

REV	DATE	DETAILS

WILL RUDD DAVIDSON (GLASGOW) Ltd
100 BRUNSWICK STREET
GLASGOW
G1 1TF

PROJECT TITLE

MOSS LANE EAST
MANCHESTER

DRAWING TITLE

REVISED CONCEPTUAL
SITE MODEL

DRAWN BY	CHK'D BY	APP'D BY	DATE	SCALE
AC	SA	AMcG	29.04.24	Not to Scale
PROJECT No.	DRAWING No.	REVISION		
P23/483	P23/483/SI/R/F/12			

**MASON
EVANS**
A PHENNA GROUP COMPANY

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Ground Gas

10.3.4 Gas monitoring and our detailed gas risk assessment indicated that the site conforms to 'Characteristic Situation I', whereby gas preclusion measures are not required.

10.3.5 Radon gas protection is not required within the site.

The Built Environment

10.3.6 Concrete class DS-I, AC-I is considered sufficient to protect buried concrete from pH and sulphate levels in the soils and groundwater.

10.3.7 Given the recorded ground conditions (i.e. no evidence of any significant hydrocarbons) and results from the UKWIR analyses (which did not record any exceedances), we consider that that plastic (polyethylene) water supply pipes would be suitable for use within the site.

Invasive Plant Species

10.3.8 Our site walkover survey did not identify the presence of any non-native invasive plant species within the site. However, we would recommend that a specialist survey be undertaken during the growing season to confirm (or otherwise).

Construction / Maintenance Workers

10.3.9 All future site staff should remain vigilant to the risk of encountering contaminated material (**in particular asbestos fibres**) when working on-site. Prior to any works starting, a detailed method statement and risk assessment should be implemented to mitigate the risk of toxic contaminants to future groundworkers, including:

- Use of appropriately qualified personnel for the task with the appropriate PPE;
- Provision of on-site washing facilities;
- Maintenance of a high standard of basic hygiene; and
- Implementation of a non-smoking and eating policy within the working area, with designated clean areas set aside for these activities.

10.3.10 In addition, should previously unidentified contaminated material be encountered, we should be immediately contacted for further advice.

10.4 **Waste Management Legislation**

- 10.4.1 Should materials be removed and disposed off-site, the developer has a statutory responsibility under the Duty of Care Regulations of the Environmental Protection Act 1990 to ensure that contaminated soil and water is disposed of off-site to a suitably licensed waste management facility in a safe and approved manner.
- 10.4.2 Should development plans include the removal of materials; the proposed remedial strategy plan should include details of proposed frequency and assessment standards for the waste disposal strategy.
- 10.4.3 In the event that material, uncharacteristic to that which has been previously identified within the site is encountered, we would recommend that a suitably qualified engineer / scientist obtain samples of the suspect material for chemical analysis, thus determining how the material should be managed.

10.5 **Off-Site Waste Disposal**

- 10.5.1 13 No. samples of the shallow soils were screened using HazWaste Online® in order to classify the soils as hazardous or non-hazardous waste (refer to Appendix 14).
- 10.5.2 The results from the HazWaste Online® assessment indicated that 12 No. of the samples would be classed as 'non-hazardous waste' if required to be taken off-site.
- 10.5.3 However, 1 No. of the made ground soil samples was identified as being 'hazardous waste' due elevated lead chromate concentrations.
- 10.5.4 In addition, Waste Acceptance Criteria (WAC) testing was undertaken on 2 No. samples of the made ground material. The results (included in Appendix 09) indicated that these soils would unlikely meet the criteria for 'inert waste', if to go to landfill.
- 10.5.5 Ultimately the results from the HazWaste Online® and WAC testing should be provided to specialist waste disposal contractors for review and costs for off-site disposal (if required).
- 10.5.6 Should any materials be required to be taken off-site as part of future development works, we would recommend that further testing be undertaken (on specific materials identified to go off-site) in order to confirm its waste classification and to provide a more accurate assessment.

10.6 **Contingent Liabilities**

- 10.6.1 Assessments of the site include the determination of contingent liabilities in respect of current and future ownerships subsequent to remedial measures. These consider the impact of the environmental conditions on the study area and surrounding areas on site users, properties and also the liability of the site owners.
- 10.6.2 With regard to site users, considerations in relation to liability are inherent in the development of a suitable remedial strategy. In the site-specific circumstances presented by the identified conditions, the risk levels suggest minimal liability on ownership due to the environmental conditions, subsequent to development.

- 10.6.3 The potential for liability arising from site conditions impacting on the surrounding environment largely considers the potential for migration of pollutants beyond the site boundary normally associated with groundwater. Based on the soil and water analyses and a risk assessment, we consider the potential for liability arising from the site conditions to be low.
- 10.6.4 In the event that more definitive advice is required, we would recommend that the Client seeks specific advice on the liabilities incumbent on ownership from their legal advisors.

11.0 GEOTECHNICAL ASSESSMENT

11.1 General

11.1.1 Visual assessment of soils during the sinking of boreholes was supplemented by in-situ standard penetration tests (SPT's). It should be recognised that SPT testing of cohesive soils will only provide an indicative assessment of soils strength, although testing of granular soils will provide more reliable test data.

11.1.2 Geotechnical test results are included in Appendix 11.

11.1.3 Note that due to the heavily weathered nature of the bedrock, no core recovery (within 6 m of rockhead) was able to be retrieved during our investigations.

11.2 Natural Glacial Soils

11.2.1 The natural subsoils below the site were described as firm, brown and grey mottled orange, slightly silty CLAY (weathered), proven to between 1.70 m and 2.50 m bgl, underlain by stiff becoming very stiff, greyish brown, slightly silty, slightly gravelly CLAY (unweathered), proven to 8.20 m bgl.

11.2.2 10 No. samples of the natural soil were sent for testing, providing comment on particle size distribution, moisture content, plasticity and shear strength. The results of laboratory testing are summarised in Tables 24 to 26 below.

Table 24 – Summary of Particle Size Distribution (PSD) Testing

Sample	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	On-Site Description
BH01 2.70 – 3.15 m	48	46	3	3	Stiff, greyish brown, slightly silty, slightly gravelly CLAY
BH01 4.70 – 5.15 m	24	27	37	12	Very stiff, greyish brown, slightly silty, slightly gravelly CLAY
BH02 1.20 – 1.65 m	52	42	2	4	Firm, brown and grey mottled orange, slightly silty CLAY with rare gravel
BH02 3.00 – 3.45 m	40	44	14	2	Stiff, greyish brown, slightly silty, slightly gravelly CLAY
BH02 5.00 – 5.45 m	50	43	3	4	Very stiff, greyish brown, slightly silty, slightly gravelly CLAY
BH03 1.20 – 1.50 m	46	41	12	1	Firm, brown and grey mottled orange, slightly silty CLAY with rare gravel
BH03 3.00 – 3.35 m	45	45	9	1	Stiff, greyish brown, slightly silty, slightly gravelly CLAY
BH04 3.00 – 3.50 m	41	39	18	2	Stiff, greyish brown, slightly silty, slightly gravelly CLAY
BH05 3.00 – 3.40 m	33	57	7	3	Stiff, greyish brown, slightly silty, slightly gravelly CLAY
BH05 4.00 – 4.40 m	33	34	29	4	Very stiff, greyish brown, slightly silty, slightly gravelly CLAY

11.2.3 The results from the PSD testing were generally consistent with the on-site visual descriptions, recording CLAY subsoils with a relatively low granular (i.e. sand and gravel) content.

Table 25 – Summary of Atterberg Testing

Sample	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Remarks
BH01 at 2.70 – 3.15 m	18.7	38	21	Clay with Intermediate Plasticity
BH01 at 4.70 – 5.15 m	10.9	36	22	Clay with Intermediate Plasticity
BH02 at 1.20 – 1.65 m	26.4	57	35	Clay with High Plasticity
BH02 at 3.00 – 3.45 m	19.9	46	27	Clay with Intermediate Plasticity
BH02 at 5.00 – 5.45 m	22.1	45	27	Clay with Intermediate Plasticity
BH03 at 1.50 m	22.4	43	25	Clay with Intermediate Plasticity
BH03 at 3.35 m	21.2	43	24	Clay with Intermediate Plasticity
BH04 at 3.50 m	24.1	36	20	Clay with Intermediate Plasticity
BH05 at 3.40 m	19.1	42	24	Clay with Intermediate Plasticity
BH05 at 4.40 m	18.3	31	16	Clay with Low Plasticity

Table 26 – Summary of Multi-Stage Tri-axial Compression Testing

Sample	Avg. undrained Shear Stress (kPa)	Cohesion (kPa)
BH01 2.70 – 3.15 m	147.3	101.4
BH01 4.70 – 5.15 m	117.6	91.3
BH02 1.20 – 1.65 m	48.0	36.8
BH02 3.00 – 3.45 m	148.0	86.1
BH02 5.00 – 5.45 m	110.0	84.3
BH03 1.20 – 1.50 m	143.6	100.0
BH03 3.00 – 3.35 m	82.3	62.5
BH04 3.00 – 3.50 m	36.3	29.0
BH05 3.00 – 3.40 m	27.0	25.0
BH05 4.00 – 4.40 m	119.3	98.9

- 11.2.5 The results from the Atterberg testing recorded the soils to generally comprise 'clay with intermediate plasticity' with moisture content values ranging between 10.9% and 26.4% (average of 20.31%). One of the samples (BH02 at 1.20 m to 1.65 m) was recorded to comprise 'clay with high plasticity', though we consider this to be associated with a localised shallow soft spot within the weathered strata.
- 11.2.6 The shear strength testing recorded average undrained shear stress values to range between 27.0 kPa and 148.0 kPa with cohesion values of between 25.0 kPa and 101.4 kPa, generally indicative of firm to stiff soils (albeit with localised soft spots).

11.2.7 SPT's were undertaken within the natural glacial soils at depths of between 1.20 m and 6.95 m. The shallow soils recorded un-corrected N values of between 9 and 47 (increasing with depth), indicative of firm becoming very stiff cohesive soils, supporting the observations made on-site.

11.2.8 Results are summarised in Tables 27 and 28.

Table 27 – SPT Results

SPT Depth (m bgl)	Recorded (un-corrected) N values				
	BH01	BH02	BH03	BH04	BH05
1.20 – 1.65	14 (c)	-	10 (c)	9 (c)	9 (c)
1.70 – 2.15	15 (c)	-	-	-	-
2.00 – 2.45	-	16 (c)	15 (c)	17 (c)	10 (c)
3.00 – 3.45	-	-	26 (c)	24 (c)	23 (c)
3.70 – 4.15	22 (c)	-	-	-	-
4.00 – 4.45	-	24 (c)	24 (c)	47 (c)	37 (c)
4.45 – 4.90	-	-	28 (c)	-	-
6.20 – 6.65	36 (c)	-	-	-	-
6.50 – 6.95	-	37 (c)	-	-	-
8.40 – 8.70	>50 (g)	>50 (g)	-	-	-

Table 28 – N Value Classification

Cohesive Soils (c)		Granular Soils (g)	
N Values	Classification	N Values	Classification
0 - 4	Very Soft	0 - 4	Very Loose
4 - 8	Soft	4 - 10	Loose
8 - 16	Firm	10 - 30	Medium Dense
16 - 32	Stiff	30 - 50	Dense
>32	Very Stiff	>50	Very Dense

11.3 Inspection Pits for Existing Foundations

11.3.1 2 No. hand dug foundation pits (FP04 and FP05) were excavated at the existing buildings along the southern site boundary to determine the depth and condition of foundations (refer to locations shown on drawing No. P23/483/SI/R/F/07).

11.3.2 FP04 recorded the base of the foundation at 1.10 m bgl with a foundation scantment of approximately 0.20 m. The thickness of the foundation was recorded to be approximately 0.20 m.

11.3.3 FP05 recorded the base of the foundation at >1.20 m bgl (i.e. the maximum depth able to be sunk with the hand tools) with a foundation scantment of approximately 0.30 m. The thickness of the foundation was recorded to be approximately 0.35 m.

11.3.4 A copy of the foundation pit logs plus sketches are included in Appendix 15.

11.4 **Infiltration Testing**

- 11.4.1 Within two of the soil bores (BH03 and BH05), falling head permeability tests were undertaken between 1.70 m and 2.00 m depth to determine the permeability range of the underlying shallow soils.
- 11.4.2 The tests were not able to provide an infiltration rate, which was to be expected given the cohesive nature of the shallow soils (with a fines content of up to 94% as per Table 24) and indicative of a very low infiltration rate.
- 11.4.3 As such, we do not consider the shallow soils below the site to be suitable for natural drainage purposes.
- 11.4.4 A copy of the permeability test results is included in Appendix I6.

12.0 FOUNDATION RECOMENDATIONS

12.1 Proposed Development

- 12.1.1 The development proposals for the site are understood include for a new 9-storey residential flatted development with associated courtyard areas.

12.2 Foundations

- 12.2.1 The ground conditions on-site recorded MADE GROUND described as soft, brown, sandy, gravelly clay with fragments, of brick, burnt shale, concrete and traces of ash, proven to between 0.90 m and 1.20 m bgl underlain by natural glacial subsoils described as firm, brown and grey mottled orange, slightly silty CLAY (weathered), proven to between 1.70 m and 2.50 m bgl, underlain by stiff becoming very stiff, greyish brown, slightly silty, slightly gravelly CLAY (unweathered), proven to 8.20 m bgl.
- 12.2.2 Sedimentary bedrock was encountered at rockhead depths of between 13.20 m and 14.20 m bgl (23.00 mAOD to 24.30 mAOD), described as heavily weathered red SANDSTONE.
- 12.2.3 It is considered that a shallow pervasive water body does not exist below the site.
- 12.2.4 It is our understanding that given the load requirements of the proposed development, the Engineer is proposing a piled foundation solution.
- 12.2.5 Based on existing site levels, the stiff / dense (or better) natural (unweathered) clay subsoils may be suitable for use as a foundation bearing horizon. These soils would provide an allowable bearing capacity of 100 kN/m² between depths of approximately 1.70 m to 2.50 m bgl, 150 kN/m² between depths of approximately 2.50 m to 5.00 m bgl and 200 kN/m² from depths of approximately 5.00 m to 13.20 m (i.e. down to rockhead).
- 12.2.6 The recorded depths and levels to stiff / dense (or better) natural cohesive subsoils are indicated on Drawing No. P23/483/SI/R/F/09.
- 12.2.7 Alternatively, the underlying weathered SANDSTONE bedrock could be used as a foundation bearing horizon which would provide an allowable bearing capacity of 500 kN/m² from depths between approximately 13.20 m and 18.00 m bgl.
- 12.2.8 The recorded depths and levels to rockhead are indicated in Drawing No. P23/483/SI/R/F/10.
- 12.2.9 Note that we would recommend that future piled foundations do not straddle between the soil and the rock in order to limit the potential for differential settlement to occur.
- 12.2.10 Detailed discussions with specialist contractors and the structural engineer should be undertaken with regard to the final design of the piled foundations.

13.0 CONCLUSIONS AND RECOMMENDATIONS

13.1 General

- 13.1.1 Intrusive investigations have been undertaken to identify ground related risks that have the potential to impact on the proposed development at the site.
- 13.1.2 The site was noted to be flat lying throughout with surface levels of approximately 37.50 mAOD and was occupied by flatted residential properties with associated parking and landscaped areas at the time of our investigations.
- 13.1.3 The ground conditions recorded MADE GROUND described as soft, brown, sandy, gravelly clay with fragments, of brick, burnt shale, concrete and traces of ash, proven to between 0.90 m and 1.20 m bgl underlain by natural glacial subsoils described as firm, brown and grey mottled orange, slightly silty CLAY (weathered), proven to between 1.70 m and 2.50 m bgl, underlain by stiff becoming very stiff, greyish brown, slightly silty, slightly gravelly CLAY (unweathered), proven to 8.20 m bgl.
- 13.1.4 Sedimentary bedrock was encountered at rockhead depths of between 13.20 m and 14.20 m bgl (23.00 mAOD to 24.30 mAOD), described as heavily weathered red SANDSTONE.
- 13.1.5 A shallow pervasive water table was not recorded below the site.

13.2 Chemical Contamination and Gas Emissions

- 13.2.1 Within the soil analyses, elevated toxic metal (lead) and poly aromatic hydrocarbon (benzo(a)pyrene and dibenzo(a,h)anthracene) contaminants were recorded within the shallow made ground soils. In addition, asbestos fibres were encountered within the made ground deposits between 0.50 m and 1.00 m depth. Subsequent quantification analyses recorded the total mass percentage of asbestos to range between <0.001% and 0.006% (i.e. low). It is considered that the shallow made ground soils pose a toxic risk to human health and therefore, we recommend that all future areas of soft landscaping (underlain by made ground materials) should be underlain by an environmental capping layer consisting of 600 mm clean, inert topsoil / subsoil further underlain by a high-visibility geotextile (i.e. an anti-dig layer).
- 13.2.2 The shallow soils do not pose a phytotoxic risk to future plant life.
- 13.2.3 Based on results from soil leachate and groundwater analyses plus our detailed risk assessment, it was concluded that the shallow soils do not pose a risk to the wider water environment (with the most sensitive receptor considered to be the deep bedrock groundwater).
- 13.2.4 Gas monitoring and our detailed risk assessment has indicated that ground gas protection measures are not required beneath the proposed development. From the site characteristic hazardous gas flow rate, as calculated and based on a worst-case scenario, the ground gas regime was classified as 'Characteristic Situation 1' and as such, ground gas preclusion measures are not considered necessary.
- 13.2.5 Radon gas preclusion measures are not considered necessary.

13.3 The Built Environment

- 13.3.1 Concrete class DS-2, AC-1s is considered sufficient to protect buried concrete from pH and sulphate levels in the soils and groundwater.
- 13.3.2 Given the recorded ground conditions and results from the UKWIR analyses (which did not record any exceedances), we consider that that plastic (polyethylene) water supply pipes would be suitable for use within the site.
- 13.3.3 Due to the presence of (albeit low quantity) asbestos fibres, all future water supply pipes should be laid in widened trenches (approximately 1.00 m wide) and backfilled with clean, inert material.

13.4 Infiltration Testing

- 13.4.1 Falling head permeability tests were undertaken within two of the boreholes which were not able to provide an infiltration rate, which was to be expected given the cohesive nature of the shallow soils.
- 13.4.3 As such, we do not consider the shallow soils below the site to be suitable for natural drainage purposes.

13.5 Foundation Recommendations (Based on Existing Site Levels)

- 13.5.1 It is our understanding that given the load requirements of the proposed development, the Engineer is proposing a piled foundation solution.
- 13.5.2 Based on existing site levels, the stiff / dense (or better) natural (unweathered) clay subsoils may be suitable for use as a foundation bearing horizon. These soils would provide an allowable bearing capacity of 100 kN/m² between depths of approximately 1.70 m to 2.50 m bgl, 150 kN/m² between depths of approximately 2.50 m to 5.00 m bgl and 200 kN/m² from depths of approximately 5.00 m to 13.20 m (i.e. down to rockhead).
- 13.5.3 Alternatively, the underlying weathered SANDSTONE bedrock could be used as a foundation bearing horizon which would provide an allowable bearing capacity of 500 kN/m² from depths between approximately 13.20 m and 18.00 m bgl.
- 13.5.4 We would recommend that future piled foundations do not straddle between the soil and the rock in order to limit the potential for differential settlement to occur.
- 13.5.5 Detailed discussions with specialist contractors and the structural engineer should be undertaken with regard to the final design of the piled foundations.
- 13.5.6 Finally, since our ground investigations consisted of soil bores and not trial pits, the side wall stability is currently unknown. If further information is required on side wall stability, this will need to be assessed during future excavation works.

13.6 Mining and Quarrying

13.6.1 The site is not at risk of ground instability as a result of historical mining or quarrying activities.

13.7 Invasive Plant Species

13.7.1 Our site walkover survey did not identify the presence of any non-native invasive plant species within the site. However, we would recommend that a specialist survey be undertaken during the growing season to confirm (or otherwise).

13.8 Consultation with the Local Authority

13.8.1 It should be noted that various local authority departments may become involved in the review of the site conditions. While measures proposed are consistent with conventional practice, we would advise that before design works are advanced to any considerable stage appropriate approvals are received from the relevant Council departments. We would be pleased to liaise with the Council's representatives in this regard.

We trust that this will meet with your current requirements. However, should you require any further information, please do not hesitate to contact us.



Scott Armstrong
Principal Geo-Environmental Engineer



Andrew McGuire
Associate

Appendix 01

Site Walkover Survey (February 2024)

Appendix 02

Groundsure Report (with Historical Ordnance Survey Maps)

470, MOSS LANE EAST, MANCHESTER, M14 4PJ

Order Details

Date: 07/03/2024
Your ref: P23-483-SA
Our Ref: GS-BYW-VDG-53U-L29

Site Details

Location: 384867 395648
Area: 0.18 ha
Authority: [Manchester City Council](#) ↗



Summary of findings

[p. 2 >](#) **Aerial image**

[p. 9 >](#)

OS MasterMap site plan

[p.14 >](#) groundsure.com/insightuserguide ↗

Contact us with any questions at:

info@groundsure.com ↗

01273 257 755

Summary of findings

Page	Section	Past land use >	On site	0-50m	50-250m	250-500m	500-2000m
15 >	1.1 >	Historical industrial land uses >	0	4	18	23	-
17 >	1.2 >	Historical tanks >	0	0	0	4	-
18 >	1.3 >	Historical energy features >	0	0	2	8	-
18	1.4	Historical petrol stations	0	0	0	0	-
19 >	1.5 >	Historical garages >	0	2	13	4	-
20	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped >	On site	0-50m	50-250m	250-500m	500-2000m
21 >	2.1 >	Historical industrial land uses >	0	7	25	35	-
24 >	2.2 >	Historical tanks >	0	0	0	6	-
25 >	2.3 >	Historical energy features >	0	0	2	18	-
26	2.4	Historical petrol stations	0	0	0	0	-
26 >	2.5 >	Historical garages >	0	3	21	5	-
Page	Section	Waste and landfill >	On site	0-50m	50-250m	250-500m	500-2000m
28	3.1	Active or recent landfill	0	0	0	0	-
28	3.2	Historical landfill (BGS records)	0	0	0	0	-
29	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
29	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
29	3.5	Historical waste sites	0	0	0	0	-
29	3.6	Licensed waste sites	0	0	0	0	-
29 >	3.7 >	Waste exemptions >	0	0	0	10	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
31 >	4.1 >	Recent industrial land uses >	0	0	6	-	-
32 >	4.2 >	Current or recent petrol stations >	0	1	3	0	-
32	4.3	Electricity cables	0	0	0	0	-
33	4.4	Gas pipelines	0	0	0	0	-
33	4.5	Sites determined as Contaminated Land	0	0	0	0	-



33	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
33	4.7	Regulated explosive sites	0	0	0	0	-
33	4.8	Hazardous substance storage/usage	0	0	0	0	-
34	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
34	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
34 >	4.11 >	Licensed pollutant release (Part A(2)/B) >	0	0	5	2	-
35	4.12	Radioactive Substance Authorisations	0	0	0	0	-
35 >	4.13 >	Licensed Discharges to controlled waters >	0	0	3	1	-
36	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
36	4.15	Pollutant release to public sewer	0	0	0	0	-
37	4.16	List 1 Dangerous Substances	0	0	0	0	-
37	4.17	List 2 Dangerous Substances	0	0	0	0	-
37	4.18	Pollution Incidents (EA/NRW)	0	0	0	0	-
37	4.19	Pollution inventory substances	0	0	0	0	-
37	4.20	Pollution inventory waste transfers	0	0	0	0	-
38	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology >	On site	0-50m	50-250m	250-500m	500-2000m
39 >	5.1 >	Superficial aquifer >	Identified (within 500m)				
41 >	5.2 >	Bedrock aquifer >	Identified (within 500m)				
43 >	5.3 >	Groundwater vulnerability >	Identified (within 50m)				
44	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
44	5.5	Groundwater vulnerability- local information	None (within 0m)				
45 >	5.6 >	Groundwater abstractions >	0	0	0	0	19
50	5.7	Surface water abstractions	0	0	0	0	0
51	5.8	Potable abstractions	0	0	0	0	0
51 >	5.9 >	Source Protection Zones >	1	0	0	0	-
51	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology >	On site	0-50m	50-250m	250-500m	500-2000m
52	6.1	Water Network (OS MasterMap)	0	0	0	-	-



52	6.2	Surface water features	0	0	0	-	-
53 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
53 >	6.4 >	WFD Surface water bodies >	0	0	0	-	-
54 >	6.5 >	WFD Groundwater bodies >	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
55	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
55	7.2	Historical Flood Events	0	0	0	-	-
55	7.3	Flood Defences	0	0	0	-	-
56	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
56	7.5	Flood Storage Areas	0	0	0	-	-
57	7.6	Flood Zone 2	None (within 50m)				
57	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding >					
58 >	8.1 >	Surface water flooding >	1 in 30 year, 0.3m - 1.0m (within 50m)				
Page	Section	Groundwater flooding >					
60 >	9.1 >	Groundwater flooding >	Moderate-High (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
61	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
61	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
61	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
61	10.4	Special Protection Areas (SPA)	0	0	0	0	0
62	10.5	National Nature Reserves (NNR)	0	0	0	0	0
62	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
62	10.7	Designated Ancient Woodland	0	0	0	0	0
62	10.8	Biosphere Reserves	0	0	0	0	0
63	10.9	Forest Parks	0	0	0	0	0
63	10.10	Marine Conservation Zones	0	0	0	0	0
63	10.11	Green Belt	0	0	0	0	0
63	10.12	Proposed Ramsar sites	0	0	0	0	0



63	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
64	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
64	10.15	Nitrate Sensitive Areas	0	0	0	0	0
64	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
65 >	10.17 >	SSSI Impact Risk Zones >	1	-	-	-	-
66	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations >	On site	0-50m	50-250m	250-500m	500-2000m
67	11.1	World Heritage Sites	0	0	0	-	-
68	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
68	11.3	National Parks	0	0	0	-	-
68 >	11.4 >	Listed Buildings >	1	0	3	-	-
69	11.5	Conservation Areas	0	0	0	-	-
69	11.6	Scheduled Ancient Monuments	0	0	0	-	-
69	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations >	On site	0-50m	50-250m	250-500m	500-2000m
70 >	12.1 >	Agricultural Land Classification >	Urban (within 250m)				
71	12.2	Open Access Land	0	0	0	-	-
71	12.3	Tree Felling Licences	0	0	0	-	-
71	12.4	Environmental Stewardship Schemes	0	0	0	-	-
71	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations >	On site	0-50m	50-250m	250-500m	500-2000m
72 >	13.1 >	Priority Habitat Inventory >	0	1	18	-	-
73	13.2	Habitat Networks	0	0	0	-	-
73	13.3	Open Mosaic Habitat	0	0	0	-	-
74	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
75 >	14.1 >	10k Availability >	Identified (within 500m)				
76 >	14.2 >	Artificial and made ground (10k) >	0	0	2	2	-
78 >	14.3 >	Superficial geology (10k) >	1	0	1	0	-

79	14.4	Landslip (10k)	0	0	0	0	-
80 >	14.5 >	Bedrock geology (10k) >	1	0	1	1	-
81	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
82 >	15.1 >	50k Availability >	Identified (within 500m)				
83	15.2	Artificial and made ground (50k)	0	0	0	0	-
83	15.3	Artificial ground permeability (50k)	0	0	-	-	-
84 >	15.4 >	Superficial geology (50k) >	1	0	0	0	-
85 >	15.5 >	Superficial permeability (50k) >	Identified (within 50m)				
85	15.6	Landslip (50k)	0	0	0	0	-
85	15.7	Landslip permeability (50k)	None (within 50m)				
86 >	15.8 >	Bedrock geology (50k) >	1	0	0	1	-
87 >	15.9 >	Bedrock permeability (50k) >	Identified (within 50m)				
87	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes >	On site	0-50m	50-250m	250-500m	500-2000m
88 >	16.1 >	BGS Boreholes >	0	1	67	-	-
Page	Section	Natural ground subsidence >					
92 >	17.1 >	Shrink swell clays >	Very low (within 50m)				
93 >	17.2 >	Running sands >	Very low (within 50m)				
94 >	17.3 >	Compressible deposits >	Negligible (within 50m)				
95 >	17.4 >	Collapsible deposits >	Very low (within 50m)				
96 >	17.5 >	Landslides >	Very low (within 50m)				
97 >	17.6 >	Ground dissolution of soluble rocks >	Negligible (within 50m)				
Page	Section	Mining and ground workings >	On site	0-50m	50-250m	250-500m	500-2000m
99	18.1	BritPits	0	0	0	0	-
100 >	18.2 >	Surface ground workings >	0	0	7	-	-
100	18.3	Underground workings	0	0	0	0	0
100	18.4	Underground mining extents	0	0	0	0	-
101	18.5	Historical Mineral Planning Areas	0	0	0	0	-



101	18.6	Non-coal mining	0	0	0	0	0
101 >	18.7 >	JPB mining areas >	Identified (within 0m)				
101	18.8	The Coal Authority non-coal mining	0	0	0	0	-
102	18.9	Researched mining	0	0	0	0	-
102	18.10	Mining record office plans	0	0	0	0	-
102	18.11	BGS mine plans	0	0	0	0	-
102	18.12	Coal mining	None (within 0m)				
102	18.13	Brine areas	None (within 0m)				
103	18.14	Gypsum areas	None (within 0m)				
103	18.15	Tin mining	None (within 0m)				
103	18.16	Clay mining	None (within 0m)				
Page	Section	Ground cavities and sinkholes	On site	0-50m	50-250m	250-500m	500-2000m
104	19.1	Natural cavities	0	0	0	0	-
104	19.2	Mining cavities	0	0	0	0	0
104	19.3	Reported recent incidents	0	0	0	0	-
104	19.4	Historical incidents	0	0	0	0	-
105	19.5	National karst database	0	0	0	0	-
Page	Section	Radon >					
106 >	20.1 >	Radon >	Less than 1% (within 0m)				
Page	Section	Soil chemistry >	On site	0-50m	50-250m	250-500m	500-2000m
108 >	21.1 >	BGS Estimated Background Soil Chemistry >	1	0	-	-	-
108 >	21.2 >	BGS Estimated Urban Soil Chemistry >	1	7	-	-	-
109	21.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects >	On site	0-50m	50-250m	250-500m	500-2000m
110	22.1	Underground railways (London)	0	0	0	-	-
110	22.2	Underground railways (Non-London)	0	0	0	-	-
111	22.3	Railway tunnels	0	0	0	-	-
111 >	22.4 >	Historical railway and tunnel features >	0	0	1	-	-
111	22.5	Royal Mail tunnels	0	0	0	-	-



111	22.6	Historical railways	0	0	0	-	-
112	22.7	Railways	0	0	0	-	-
112	22.8	Crossrail 1	0	0	0	0	-
112	22.9	Crossrail 2	0	0	0	0	-
112	22.10	HS2	0	0	0	0	-

Recent aerial photograph



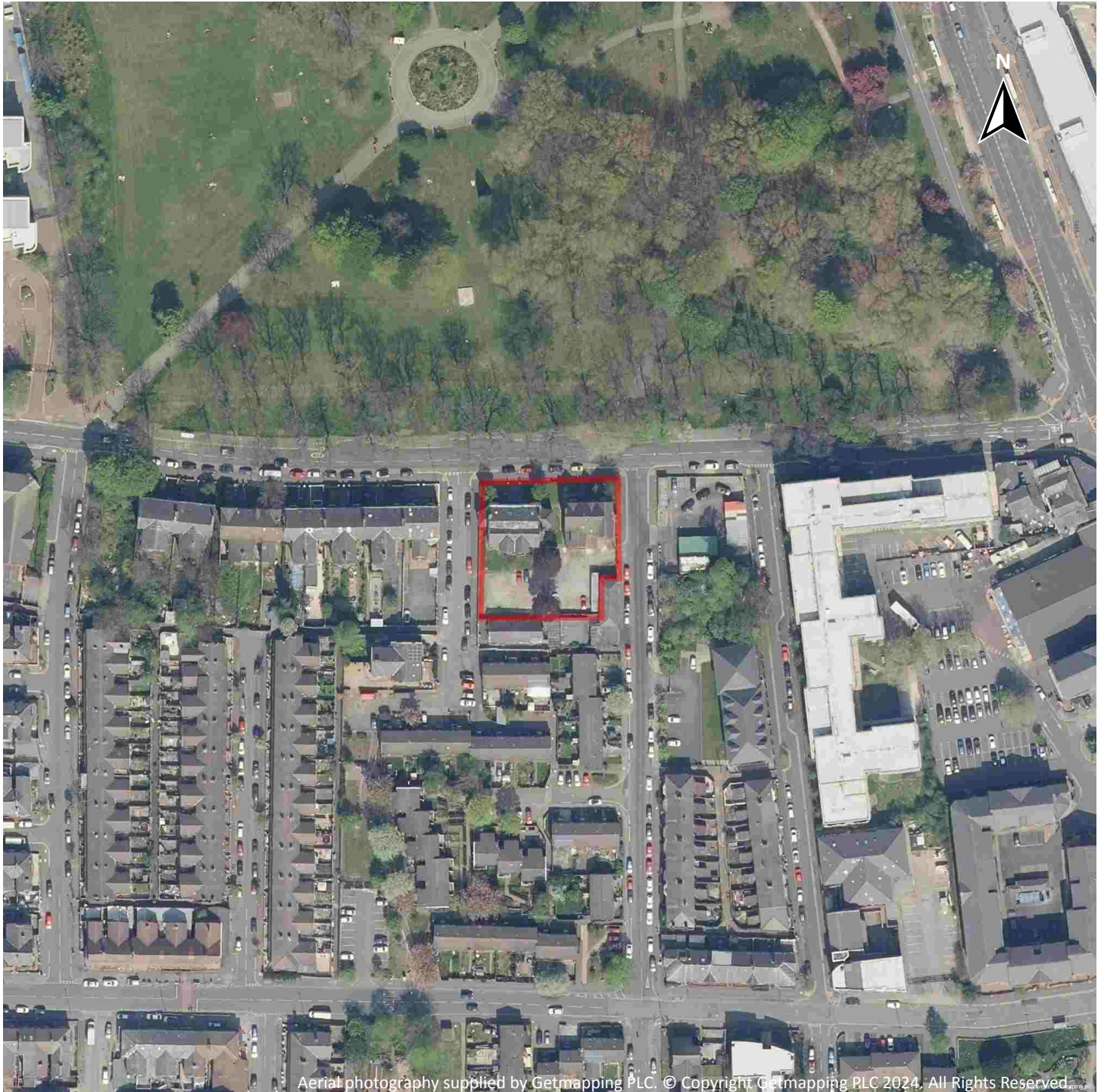
Aerial photography supplied by Getmapping PLC. © Copyright Getmapping PLC 2024. All Rights Reserved.

Capture Date: 18/10/2022

Site Area: 0.18ha



Recent site history - 2019 aerial photograph



Aerial photography supplied by Getmapping PLC. © Copyright Getmapping PLC 2024. All Rights Reserved

Capture Date: 22/04/2019

Site Area: 0.18ha



Recent site history - 2015 aerial photograph



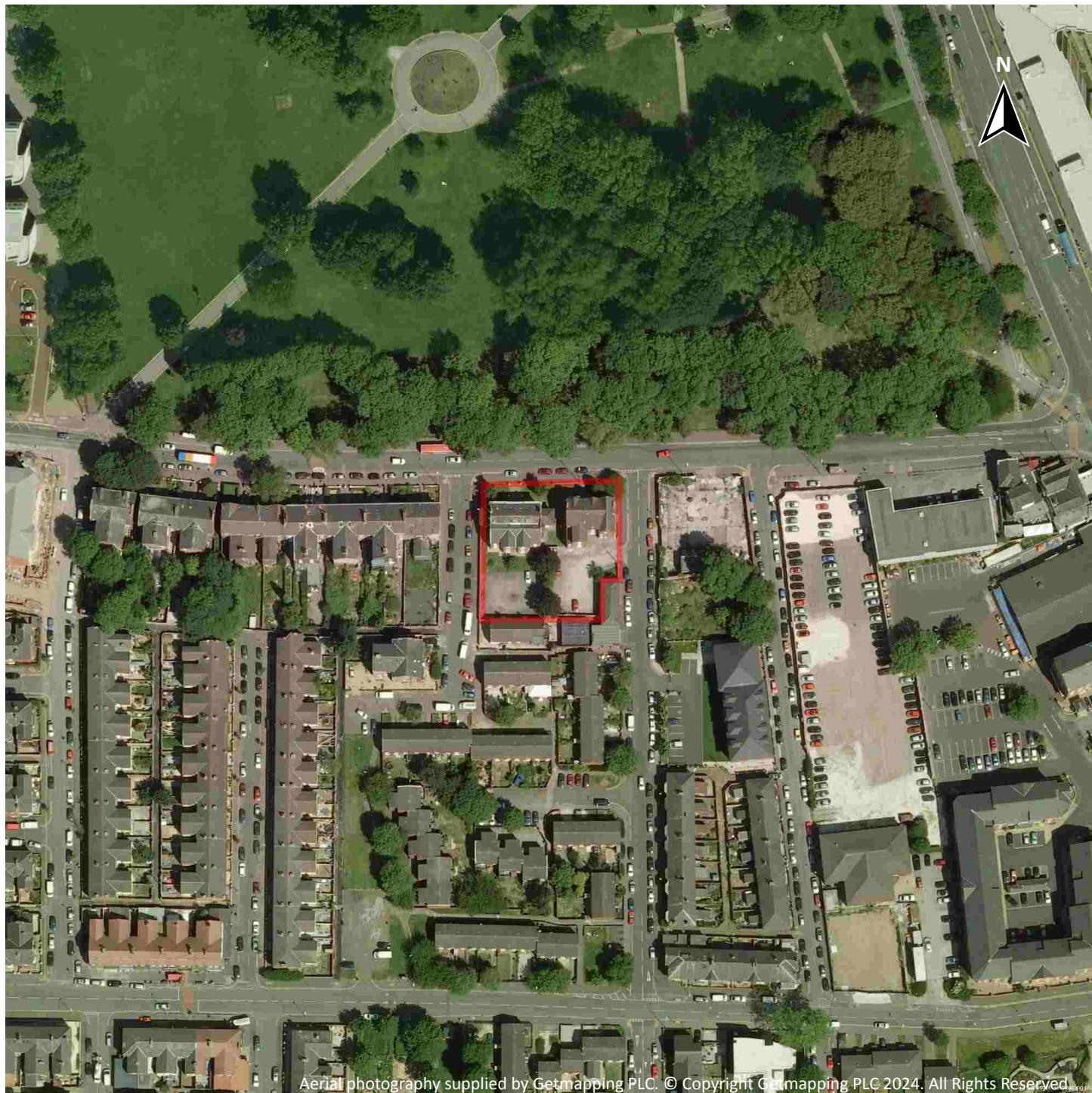
Aerial photography supplied by Getmapping PLC. © Copyright Getmapping PLC 2024. All Rights Reserved.

Capture Date: 11/06/2015

Site Area: 0.18ha



Recent site history - 2009 aerial photograph

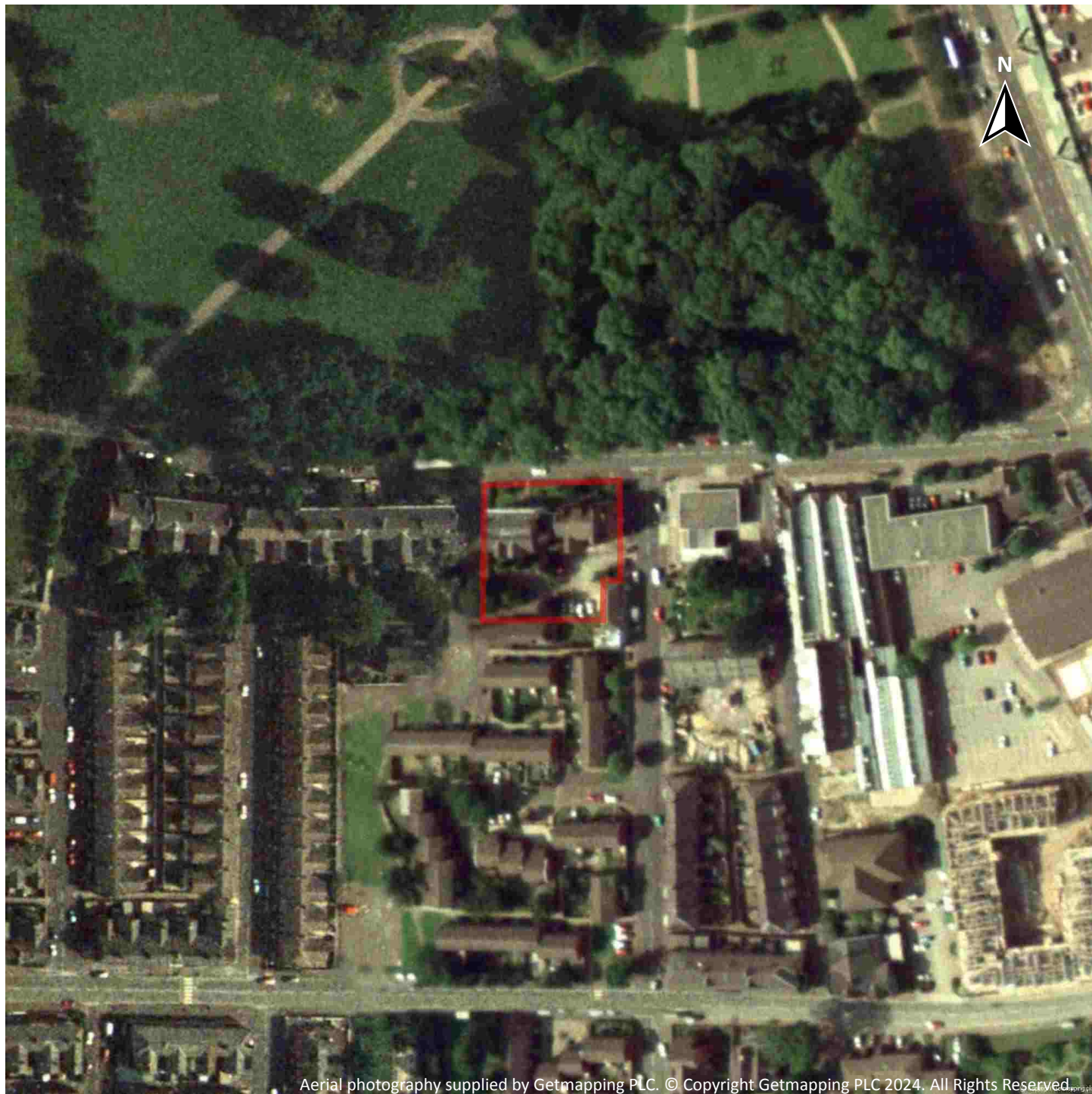


Capture Date: 02/06/2009

Site Area: 0.18ha



Recent site history - 2000 aerial photograph



Capture Date: 27/06/2000

Site Area: 0.18ha



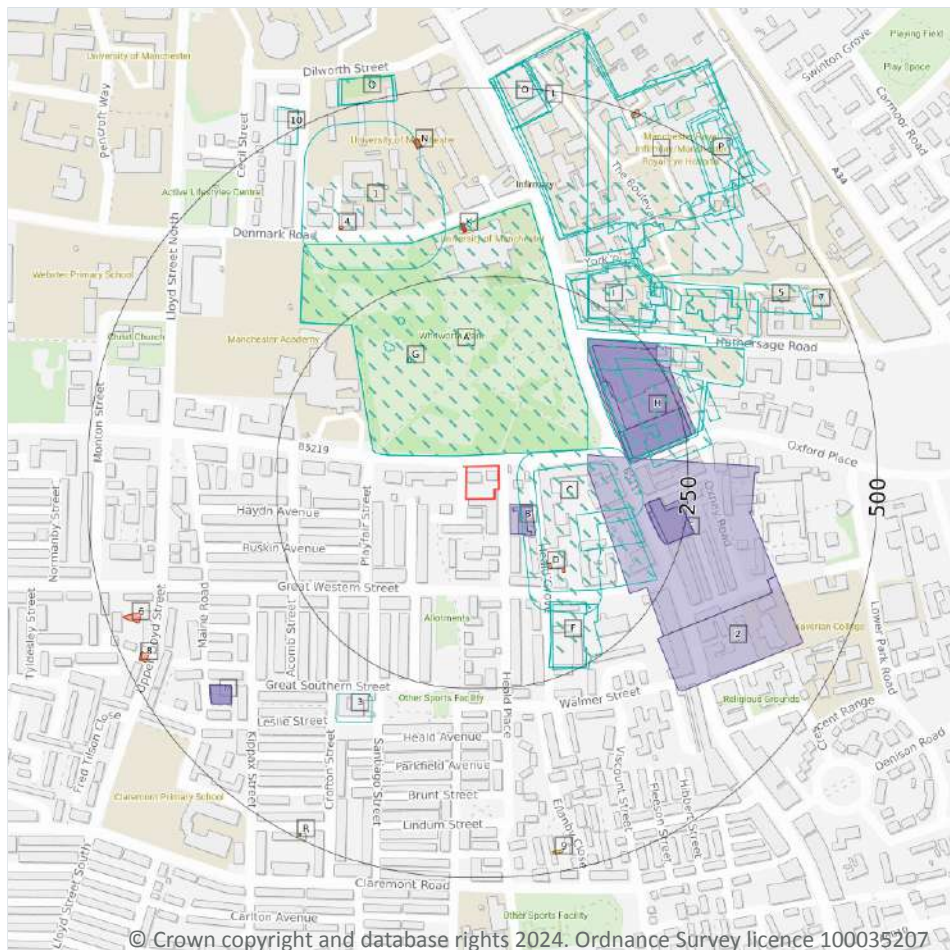
OS MasterMap site plan



Site Area: 0.18ha



1 Past land use



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

1.1 Historical industrial land uses

Records within 500m

45

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on [page 15](#) >

ID	Location	Land use	Dates present	Group ID
A	15m NW	Infirmary	1978	923267



ID	Location	Land use	Dates present	Group ID
A	15m NW	Infirmary	1985 - 1994	924246
C	24m E	Unspecified Factory	1915 - 1923	966705
C	47m E	Unspecified Commercial/Industrial	1934	796894
C	108m E	Depository	1923	797964
F	154m SE	Laundry	1915	898301
F	154m SE	Laundry	1934 - 1938	913000
G	156m NW	Boat House	1915	817499
H	158m NE	Quilt Works	1934 - 1938	903276
F	159m SE	Laundry	1923	945072
H	166m NE	Unspecified Works	1978	844768
H	166m NE	Unspecified Works	1968	922782
G	181m NW	Boat House	1923	817498
H	195m NE	Unspecified Works	1985 - 1991	913859
G	207m NW	Unspecified Tank	1915	825229
I	209m NE	Hospital	1915 - 1938	922359
I	219m NE	Hospital	1994	848052
I	219m NE	Hospital	1988	902319
I	223m NE	Hospital	1956	868737
I	228m NE	Hospital	1968	862009
I	230m NE	Hospital	1978	898101
I	232m NE	Hospital	1985 - 1991	847961
1	271m N	Infirmary	1971	934544
3	287m SW	Unspecified Works	1915 - 1923	932469
J	301m NE	Infirmary	1956 - 1968	888104
J	301m NE	Infirmary	1978	909767
J	309m N	Infirmary	1923	860268
J	310m N	Infirmary	1915 - 1994	973639
L	316m N	Hospital	1978	981247



ID	Location	Land use	Dates present	Group ID
L	316m N	Hospital	1956 - 1971	990416
I	320m NE	Unspecified Laboratory	1934 - 1938	886827
I	320m NE	Unspecified Laboratory	1915	964979
J	339m NE	Infirmery	1985	985912
5	387m NE	Unspecified Laboratory	1923	834698
O	445m N	Eye Hospital	1915	879519
O	445m N	Eye Hospital	1934 - 1938	972231
O	446m N	Eye Hospital	1923	845144
P	455m NE	Hospital	1915 - 1923	880707
7	459m NE	Unspecified Laboratory	1968	834699
O	469m N	Eye Hospital	1905	868981
10	480m NW	Hospital	1956	834384
Q	492m N	Laundry	1934 - 1938	852808
Q	492m N	Laundry	1915	903308
Q	493m N	Laundry	1923	923957
P	499m NE	Hospital	1905	947568

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m

4

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on [page 15 >](#)

ID	Location	Land use	Dates present	Group ID
9	472m S	Tanks	1950 - 1951	132104
R	493m SW	Unspecified Tank	1950	122957



ID	Location	Land use	Dates present	Group ID
R	493m SW	Unspecified Tank	1951	129136
R	493m SW	Unspecified Tank	1951	129569

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	10
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Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on [page 15 >](#)

ID	Location	Land use	Dates present	Group ID
D	111m SE	Electricity Substation	1994	62145
D	130m SE	Electricity Substation	1994	62146
K	310m N	Electricity Substation	1989	79645
K	311m N	Electricity Substation	1994	83254
4	354m NW	Electricity Substation	1989 - 1994	73602
N	425m N	Electricity Substation	1980 - 1998	65163
N	426m N	Electricity Substation	1987	67118
6	455m W	Electricity Substation	1949 - 1951	84629
8	467m SW	Electricity Substation	1982 - 1992	67967
J	492m N	Electricity Substation	1976 - 1984	64269

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0
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Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or

succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	19
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Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on [page 15 >](#)

ID	Location	Land use	Dates present	Group ID
B	21m SE	Garage	1949 - 1951	25684
B	27m SE	Garage	1951	20799
E	118m E	Garage	1991	23943
H	161m NE	Garage	1986 - 1991	24354
H	162m E	Garage	1986 - 1991	25010
H	164m NE	Motor Repair Works	1950 - 1970	25959
H	164m E	Motor Repair Works	1933	20732
H	165m E	Motor Repair Works	1950	22993
H	170m E	Motor Repair Works	1950 - 1970	25458
H	171m E	Garage	1993	23678
H	173m NE	Motor Repair Works	1950	20969
H	175m NE	Garage	1993	21659
E	193m E	Garage	1991	24608
E	199m E	Garage	1986 - 1993	24309
E	199m E	Garage	1970	23123
2	284m SE	Garage	1991	22885
M	396m SW	Garage	1982	23410
M	396m SW	Garage	1987 - 1988	25992



ID	Location	Land use	Dates present	Group ID
M	396m SW	Garage	1993	21281

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m

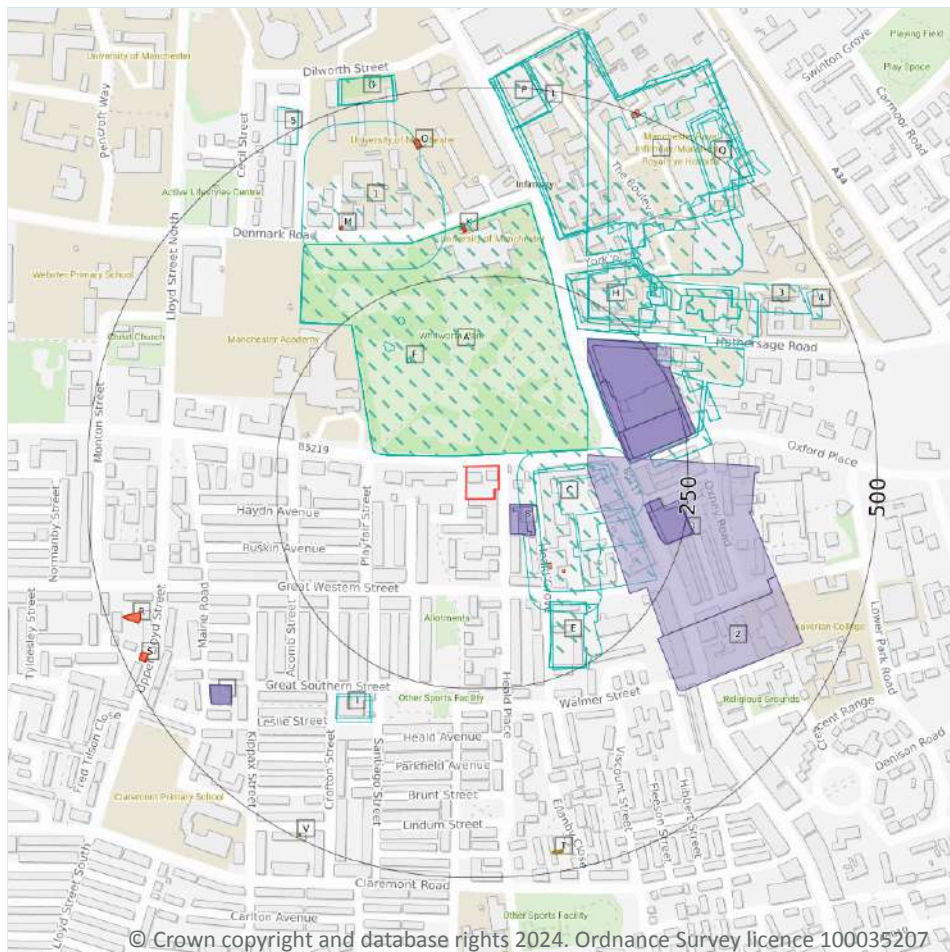
0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.



2 Past land use - un-grouped



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

2.1 Historical industrial land uses

Records within 500m

67

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on [page 21](#) >

ID	Location	Land Use	Date	Group ID
A	15m NW	Infirmary	1988	924246
A	15m NW	Infirmary	1978	923267
A	15m NW	Infirmary	1985	924246



ID	Location	Land Use	Date	Group ID
A	15m NW	Infirmery	1994	924246
C	24m E	Unspecified Factory	1923	966705
C	46m E	Unspecified Factory	1915	966705
C	47m E	Unspecified Commercial/Industrial	1934	796894
C	108m E	Depository	1923	797964
E	154m SE	Laundry	1938	913000
E	154m SE	Laundry	1934	913000
E	154m SE	Laundry	1915	898301
F	156m NW	Boat House	1915	817499
G	158m NE	Quilt Works	1938	903276
G	158m NE	Quilt Works	1934	903276
E	159m SE	Laundry	1923	945072
G	166m NE	Unspecified Works	1978	844768
G	166m NE	Unspecified Works	1968	922782
F	181m NW	Boat House	1923	817498
G	195m NE	Unspecified Works	1985	913859
G	195m NE	Unspecified Works	1991	913859
F	207m NW	Unspecified Tank	1915	825229
H	209m NE	Hospital	1938	922359
H	209m NE	Hospital	1934	922359
H	209m NE	Hospital	1915	922359
H	209m NE	Hospital	1923	922359
H	219m NE	Hospital	1988	902319
H	219m NE	Hospital	1994	848052
H	223m NE	Hospital	1956	868737
H	228m NE	Hospital	1968	862009
H	230m NE	Hospital	1978	898101
H	232m NE	Hospital	1985	847961



ID	Location	Land Use	Date	Group ID
H	232m NE	Hospital	1991	847961
1	271m N	Infirmery	1971	934544
I	287m SW	Unspecified Works	1915	932469
I	289m SW	Unspecified Works	1923	932469
J	301m NE	Infirmery	1956	888104
J	301m NE	Infirmery	1978	909767
J	301m NE	Infirmery	1968	888104
J	309m N	Infirmery	1923	860268
J	310m N	Infirmery	1938	973639
J	310m N	Infirmery	1934	973639
J	310m N	Infirmery	1915	973639
L	316m N	Hospital	1971	990416
L	316m N	Hospital	1956	990416
L	316m N	Infirmery	1988	973639
L	316m N	Hospital	1978	981247
L	316m N	Infirmery	1985	973639
L	316m N	Infirmery	1994	973639
H	320m NE	Unspecified Laboratory	1938	886827
H	320m NE	Unspecified Laboratory	1934	886827
H	320m NE	Unspecified Laboratory	1915	964979
J	339m NE	Infirmery	1985	985912
3	387m NE	Unspecified Laboratory	1923	834698
P	445m N	Eye Hospital	1938	972231
P	445m N	Eye Hospital	1934	972231
P	445m N	Eye Hospital	1915	879519
P	446m N	Eye Hospital	1923	845144
Q	455m NE	Hospital	1915	880707
Q	458m NE	Hospital	1923	880707



ID	Location	Land Use	Date	Group ID
4	459m NE	Unspecified Laboratory	1968	834699
P	469m N	Eye Hospital	1905	868981
5	480m NW	Hospital	1956	834384
U	492m N	Laundry	1938	852808
U	492m N	Laundry	1934	852808
U	492m N	Laundry	1915	903308
U	493m N	Laundry	1923	923957
Q	499m NE	Hospital	1905	947568

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m

6

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on [page 21 >](#)

ID	Location	Land Use	Date	Group ID
T	472m S	Tanks	1950	132104
T	472m S	Tanks	1951	132104
T	472m S	Tanks	1951	132104
V	493m SW	Unspecified Tank	1950	122957
V	493m SW	Unspecified Tank	1951	129136
V	493m SW	Unspecified Tank	1951	129569

This data is sourced from Ordnance Survey / Groundsure.



2.3 Historical energy features

Records within 500m

20

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on [page 21](#) >

ID	Location	Land Use	Date	Group ID
C	111m SE	Electricity Substation	1994	62145
C	130m SE	Electricity Substation	1994	62146
K	310m N	Electricity Substation	1989	79645
K	311m N	Electricity Substation	1994	83254
M	354m NW	Electricity Substation	1989	73602
M	354m NW	Electricity Substation	1994	73602
O	425m N	Electricity Substation	1994	65163
O	425m N	Electricity Substation	1993	65163
O	425m N	Electricity Substation	1998	65163
O	426m N	Electricity Substation	1980	65163
O	426m N	Electricity Substation	1987	67118
R	455m W	Electricity Substation	1951	84629
R	455m W	Electricity Substation	1950	84629
R	456m W	Electricity Substation	1951	84629
R	456m W	Electricity Substation	1949	84629
S	467m SW	Electricity Substation	1992	67967
S	467m SW	Electricity Substation	1982	67967
S	468m SW	Electricity Substation	1982	67967
J	492m N	Electricity Substation	1984	64269
J	497m NE	Electricity Substation	1976	64269

This data is sourced from Ordnance Survey / Groundsure.



2.4 Historical petrol stations

Records within 500m

0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m

29

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on [page 21 >](#)

ID	Location	Land Use	Date	Group ID
B	21m SE	Garage	1951	25684
B	21m SE	Garage	1949	25684
B	27m SE	Garage	1951	20799
D	118m E	Garage	1991	23943
G	161m NE	Garage	1986	24354
G	161m NE	Garage	1991	24354
G	161m NE	Garage	1991	24354
G	162m E	Garage	1986	25010
G	162m E	Garage	1991	25010
G	162m E	Garage	1991	25010
G	164m NE	Motor Repair Works	1970	25959
G	164m E	Motor Repair Works	1933	20732
G	165m E	Motor Repair Works	1950	22993
G	170m E	Motor Repair Works	1950	25458
G	170m E	Motor Repair Works	1970	25458
G	171m E	Garage	1993	23678

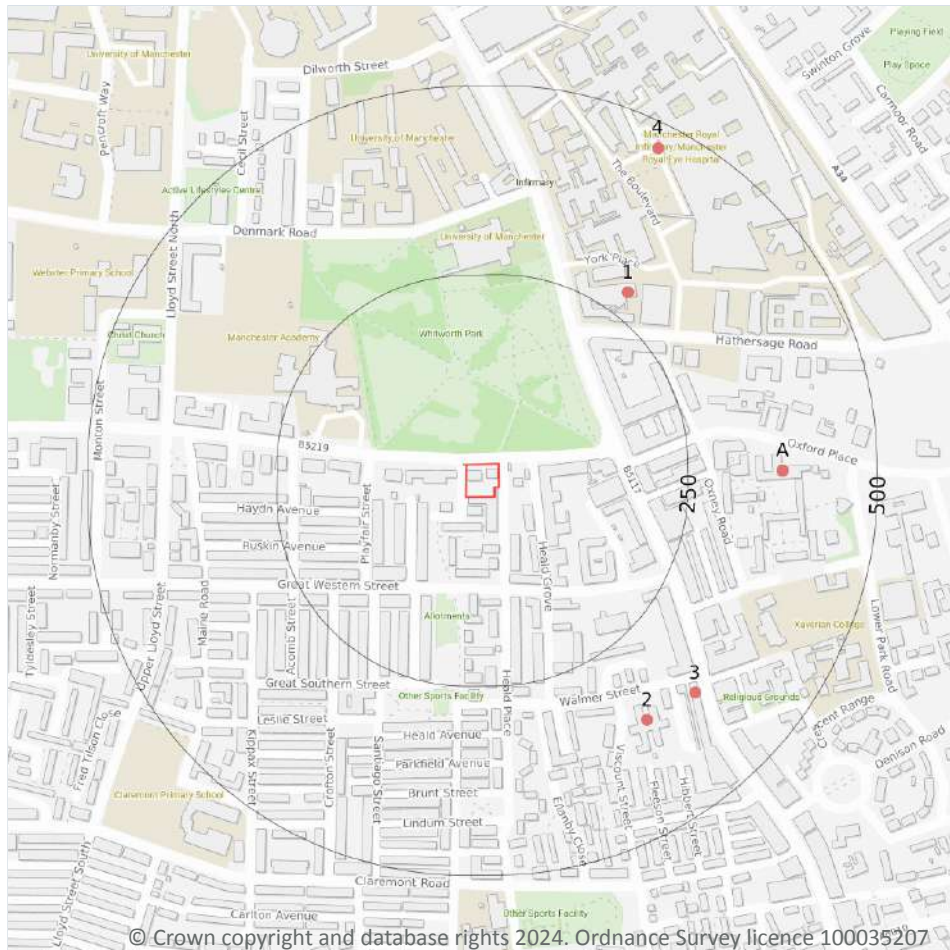


ID	Location	Land Use	Date	Group ID
G	173m NE	Motor Repair Works	1950	20969
G	173m NE	Motor Repair Works	1950	25959
G	175m NE	Garage	1993	21659
D	193m E	Garage	1991	24608
D	193m E	Garage	1991	24608
D	199m E	Garage	1993	24309
D	199m E	Garage	1970	23123
D	201m E	Garage	1986	24309
2	284m SE	Garage	1991	22885
N	396m SW	Garage	1982	23410
N	396m SW	Garage	1987	25992
N	396m SW	Garage	1988	25992
N	396m SW	Garage	1993	21281

This data is sourced from Ordnance Survey / Groundsure.



3 Waste and landfill



- Site Outline
- Search buffers in metres (m)
- Waste exemptions

3.1 Active or recent landfill

Records within 500m

0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m

0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.



3.3 Historical landfill (LA/mapping records)

Records within 500m**0**

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m**0**

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m**0**

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m**0**

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m**10**

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

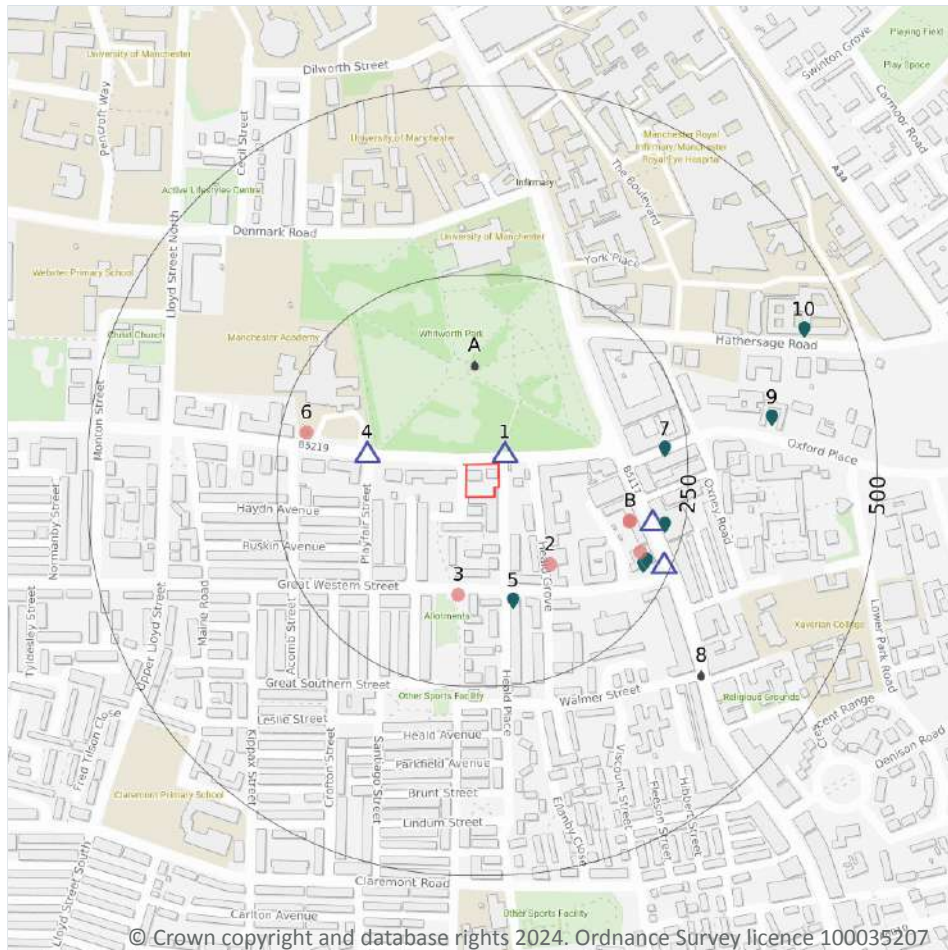
Features are displayed on the Waste and landfill map on [page 28](#) >

ID	Location	Site	Reference	Category	Sub-Category	Description
1	283m NE	ST. MARYS HOSPITAL, HATHERSAGE ROAD, MANCHESTER, M13 0JH	WEX132662	Using waste exemption	Not on a farm	Use of waste in construction
2	357m SE	RUSHOLME HEALTH CENTRE, WALMER STREET, RUSHOLME, MANCHESTER, M14 5NP	WEX331639	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
3	370m SE	58, WILMSLOW ROAD, MANCHESTER, M14 5AL	WEX331625	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
A	375m E	Victoria Park Campus, Oxford Place, Manchester, M14 5RR	WEX167801	Treating waste exemption	Not on a farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
A	375m E	Victoria Park Campus, Oxford Place, Manchester, M14 5RR	WEX167915	Storing waste exemption	Not on a farm	Storage of waste in a secure place
A	375m E	Victoria Park Campus, Oxford Place, Manchester, M14 5RR	WEX006501	Treating waste exemption	Not on a farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
A	375m E	Victoria Park, Oxford Place, Manchester, M14 5RR	WEX006663	Storing waste exemption	Not on a farm	Storage of waste in a secure place
A	375m E	Victoria Park Campus, Oxford Place, Manchester, M14 5RR	WEX301801	Treating waste exemption	Not on a Farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
A	375m E	Victoria Park Campus, Oxford Place, Manchester, M14 5RR	WEX301813	Storing waste exemption	Not on a Farm	Storage of waste in a secure place
4	467m NE	Cen Manchester Uni Hospitals NHS Foundation Trust Cobbett House M13 9WL	EPR/DF0503ZS /A001	Treating waste exemption	Non-Agricultural Waste Only	Sorting and de-naturing of controlled drugs for disposal

This data is sourced from the Environment Agency and Natural Resources Wales.



4 Current industrial land use



- Site Outline
- Search buffers in metres (m)
- Recent industrial land uses
- △ Current or recent petrol stations
- Licensed pollutant release (Part A(2)/B)
- Licensed Discharges to controlled waters

4.1 Recent industrial land uses

Records within 250m

6

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on [page 31](#) >

ID	Location	Company	Address	Activity	Category
2	115m SE	Electricity Sub Station	Greater Manchester, M14	Electrical Features	Infrastructure and Facilities
3	130m S	Electricity Sub Station	Greater Manchester, M14	Electrical Features	Infrastructure and Facilities
B	179m E	Mail Boxes Etc	6, Wilmslow Road, Manchester, Greater Manchester, M14 5TP	Distribution and Haulage	Transport, Storage and Delivery



ID	Location	Company	Address	Activity	Category
B	179m E	Techways	10, Wilmslow Road, Manchester, Greater Manchester, M14 5TP	Electrical Equipment Repair and Servicing	Repair and Servicing
B	205m SE	Shell	10, Wilmslow Road, Manchester, Greater Manchester, M14 5TQ	Petrol and Fuel Stations	Road and Rail
6	216m W	Electricity Sub Station	Greater Manchester, M14	Electrical Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	4
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Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on [page 31 >](#)

ID	Location	Company	Address	LPG	Status
1	17m NE	OBSOLETE	490, Moss Lane East, Heald Place, Rusholme, Manchester, Greater Manchester, M14 4PA	Not Applicable	Obsolete
4	133m W	OBSOLETE	353, Moss Lane East, Manchester, Greater Manchester, M14 4PY	Not Applicable	Obsolete
B	207m E	OBSOLETE	25-33, Wilmslow Road, Rusholme, Manchester, Greater Manchester, M14 5TB	Not Applicable	Obsolete
B	239m SE	SHELL	10, Wilmslow Road, Rusholme, Manchester, Greater Manchester, M14 5TQ	No	Open

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0
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High voltage underground electricity transmission cables.

This data is sourced from National Grid.



4.4 Gas pipelines

Records within 500m

0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m

0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m

0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m

0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m

0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.



4.9 Historical licensed industrial activities (IPC)

Records within 500m	0
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Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0
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Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	7
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Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on [page 31 >](#)

ID	Location	Address	Details	
5	139m S	Save, Moss Lane East, M14 4PA	Process: Petrol Vapour Recovery Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified
B	215m SE	Moss Side Service Station, Wilmslow Road, Rusholme, M14 5AQ	Process: Unloading of Petrol into Storage at Service Stations Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified
B	217m SE	Rusholme Service Station, 10 Wilmslow Road, M14 5AQ	Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified

ID	Location	Address	Details	
7	219m E	Green Bros Ltd, Condor Wks, Rusholme Place, M14 5GB	Process: Coating Processes Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified
B	224m E	Rusholme Serv Stn, Wilmslow Rd, M14 5TB	Process: Petrol Vapour Recovery Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified
9	366m E	Manchester Garages Ltd, Oxford Road, Rusholme, M13 0JD	Process: Respraying of Road Vehicles Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified
10	440m NE	Manchester Royal Infirmary, Central Services Complex Off Hathersage Road, Rusholme, M13 9WL	Process: Combustion & Incineration Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m

0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m

4

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on [page 31](#) >



ID	Location	Address	Details	
A	130m N	OXFORD ROAD CSO, MANCHESTER, GREATER MANCHESTER	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016982917 Permit Version: 2 Receiving Water: MALKIN BROOK TRIB CORN BK	Status: REVOKED - UNSPECIFIED Issue date: - Effective Date: 11/05/1995 Revocation Date: 07/11/1995
A	130m N	OXFORD ROAD CSO, MANCHESTER, GREATER MANCHESTER	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016982917 Permit Version: 3 Receiving Water: MALKIN BROOK TRIB CORN BK	Status: REVOKED - UNSPECIFIED Issue date: 08/11/1995 Effective Date: 08/11/1995 Revocation Date: 13/07/2005
A	130m N	OXFORD ROAD CSO, MANCHESTER, GREATER MANCHESTER	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016982917 Permit Version: 1 Receiving Water: MALKIN BROOK TRIB CORN BK	Status: REVOKED - UNSPECIFIED Issue date: - Effective Date: 01/01/1995 Revocation Date: 10/05/1995
8	361m SE	WALMER ST/WILMSLOW RD, MANCHESTER, GREATER MANCHESTER	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0382 Permit Version: 1 Receiving Water: -	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 01/01/1995 Revocation Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m

0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m

0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.



4.16 List 1 Dangerous Substances

Records within 500m**0**

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m**0**

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m**0**

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m**0**

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m**0**

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.



4.21 Pollution inventory radioactive waste

Records within 500m

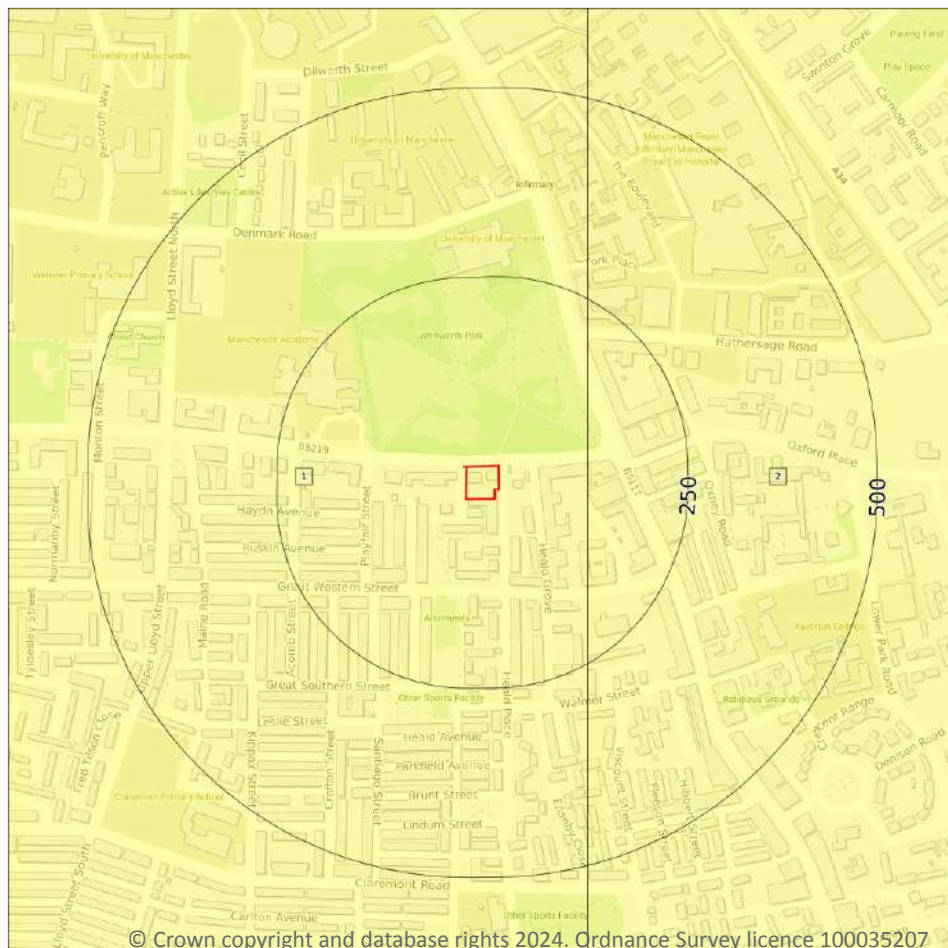
0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.



5 Hydrogeology - Superficial aquifer



- Site Outline**
- Search buffers in metres (m)**
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive
 - Unknown

5.1 Superficial aquifer

Records within 500m

2

Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on [page 39](#) >

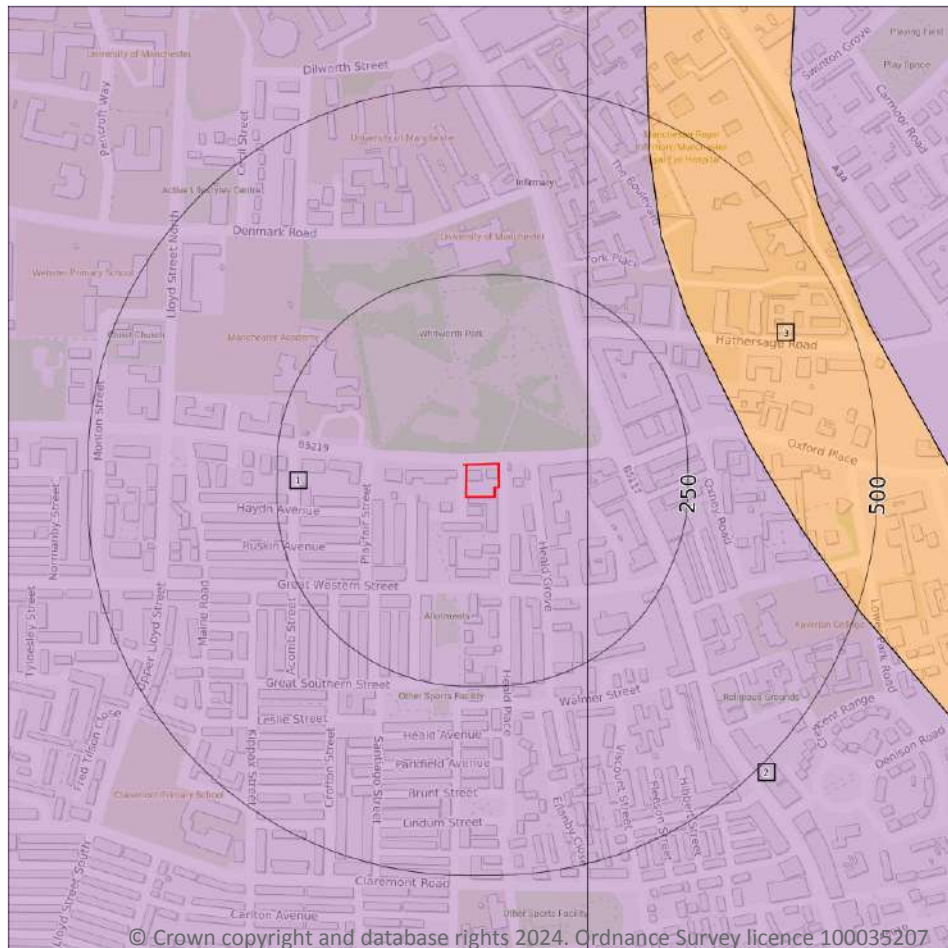
ID	Location	Designation	Description
1	On site	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	118m E	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a 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



This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.



Bedrock aquifer



- Site Outline
- Search buffers in metres (m)
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive

5.2 Bedrock aquifer

Records within 500m

3

Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on [page 41](#) >

ID	Location	Designation	Description
1	On site	Principal	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
2	118m E	Principal	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

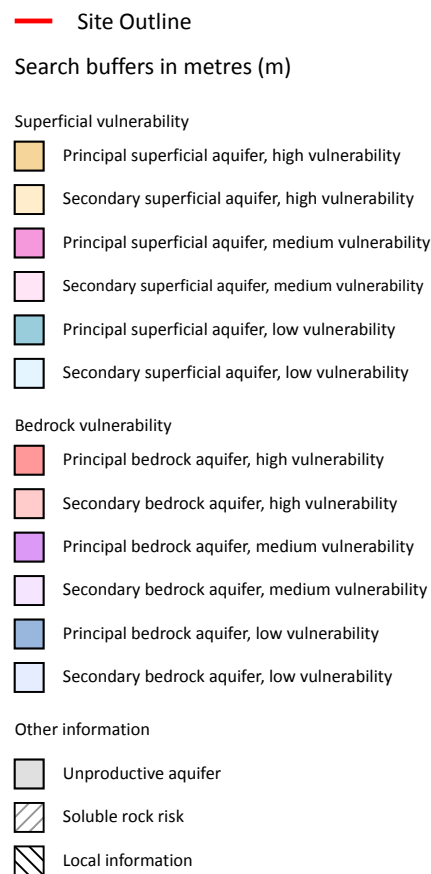
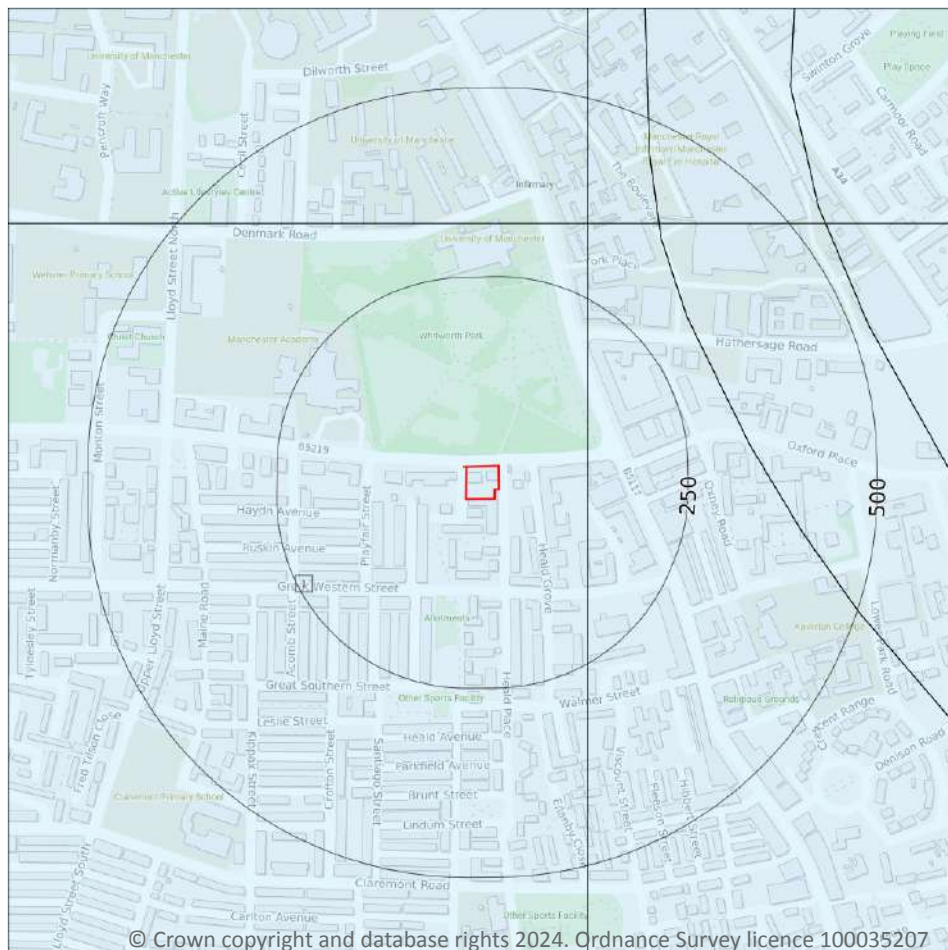


ID	Location	Designation	Description
3	310m NE	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.



Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m

1

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

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

Features are displayed on the Groundwater vulnerability map on [page 43](#) >



ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: 300- 550mm/year	Vulnerability: Low Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Principal Flow mechanism: Mixed

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0
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This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

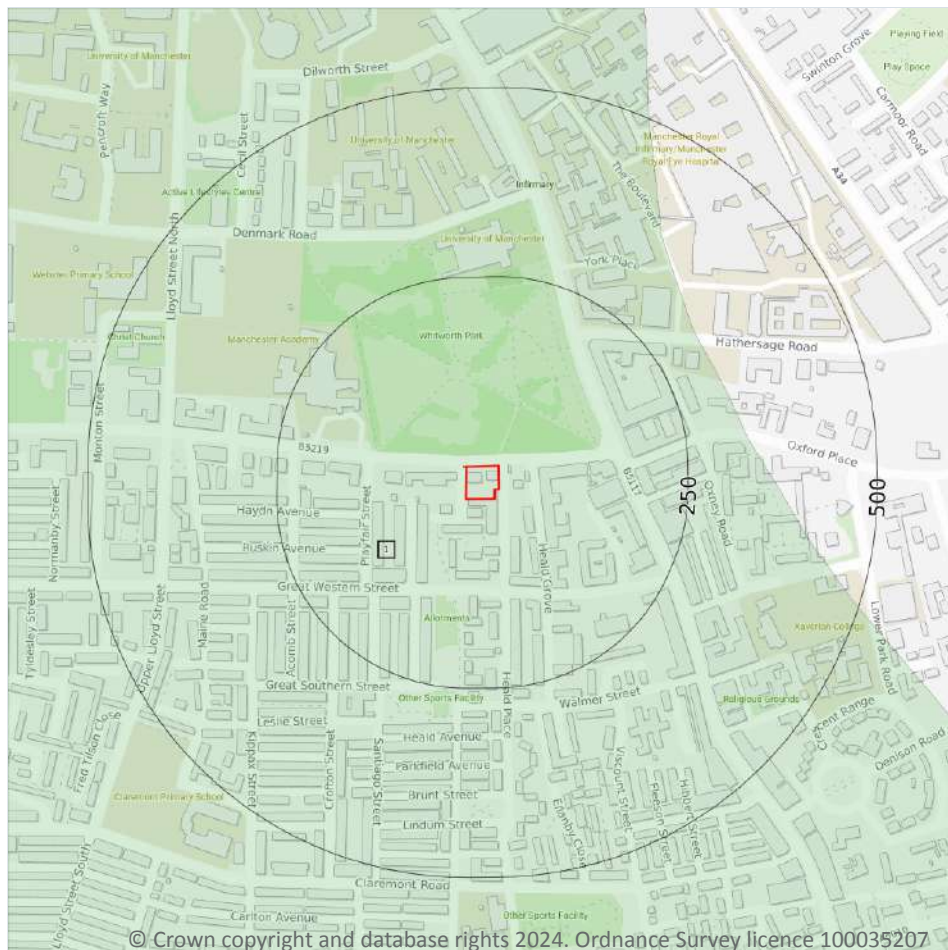
5.5 Groundwater vulnerability- local information

Records on site	0
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This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk ↗.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



- Site Outline
- Search buffers in metres (m)
- Source Protection Zone 1
Inner catchment
- Source Protection Zone 2
Outer catchment
- Source Protection Zone 3
Total catchment
- Source Protection Zone 4
Zone of Special Interest
- Source Protection Zone 1c
Inner catchment - confined aquifer
- Source Protection Zone 2c
Outer catchment - confined aquifer
- Source Protection Zone 3c
Total catchment - confined aquifer
- Drinking water abstraction licences
Polygon features
- Drinking water abstraction licences
Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m

19

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on [page 45](#) >



ID	Location	Details	
-	965m W	Status: Historical Licence No: 2569007007 Details: Process water Direct Source: Ground Water - North West Region Point: "BOREHOLE AT PREMISES, MOSS SIDE, MANCHESTER" Data Type: Point Name: SCOTTISH COURAGE BREWING LTD Easting: 383900 Northing: 395900	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 16/08/1995 Version End Date: -
-	965m W	Status: Historical Licence No: 2569007007 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Ground Water - North West Region Point: "BOREHOLE AT PREMISES, MOSS SIDE, MANCHESTER" Data Type: Point Name: SCOTTISH COURAGE BREWING LTD Easting: 383900 Northing: 395900	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 16/08/1995 Version End Date: -
-	965m W	Status: Historical Licence No: 2569007007 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES, MOSS SIDE, MANCHESTER Data Type: Point Name: SCOTTISH COURAGE BREWING LTD Easting: 383900 Northing: 395900	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/12/2003 Version End Date: -
-	965m W	Status: Historical Licence No: 2569007007 Details: Process water Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES, MOSS SIDE, MANCHESTER Data Type: Point Name: SCOTTISH COURAGE BREWING LTD Easting: 383900 Northing: 395900	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/12/2003 Version End Date: -



ID	Location	Details	
-	965m W	Status: Historical Licence No: 2569007007 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES MOSS SIDE MANCHESTER Data Type: Point Name: Heineken UK Ltd Easting: 383900 Northing: 395900	Annual Volume (m ³): 227000 Max Daily Volume (m ³): 900 Original Application No: - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 102 Version Start Date: 23/11/2009 Version End Date: -
-	965m W	Status: Historical Licence No: 2569007007 Details: Process Water Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES MOSS SIDE MANCHESTER Data Type: Point Name: Heineken UK Ltd Easting: 383900 Northing: 395900	Annual Volume (m ³): 227000 Max Daily Volume (m ³): 900 Original Application No: - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 102 Version Start Date: 23/11/2009 Version End Date: -
-	1001m W	Status: Active Licence No: 2569007007 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES MOSS SIDE MANCHESTER Data Type: Point Name: Heineken UK Ltd Easting: 383865 Northing: 395909	Annual Volume (m ³): 227000 Max Daily Volume (m ³): 900 Original Application No: NPS/WR/015793 Original Start Date: 15/02/1966 Expiry Date: - Issue No: 103 Version Start Date: 08/05/2014 Version End Date: -
-	1001m W	Status: Active Licence No: 2569007007 Details: Process Water Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES MOSS SIDE MANCHESTER Data Type: Point Name: Heineken UK Ltd Easting: 383865 Northing: 395909	Annual Volume (m ³): 227000 Max Daily Volume (m ³): 900 Original Application No: NPS/WR/015793 Original Start Date: 15/02/1966 Expiry Date: - Issue No: 103 Version Start Date: 08/05/2014 Version End Date: -



ID	Location	Details	
-	1354m NE	Status: Historical Licence No: NW/069/0004/005 Details: Heat Pump Direct Source: Ground Water - North West Region Point: AREA OF ABSTRACTION - LOWER CARBONIFEROUS LIMESTONE Data Type: Poly4 Name: G T Energy UK Limited Easting: 385729 Northing: 396778	Annual Volume (m ³): 2049840 Max Daily Volume (m ³): 8640 Original Application No: - Original Start Date: 17/01/2013 Expiry Date: 16/01/2037 Issue No: 2 Version Start Date: 11/06/2013 Version End Date: -
-	1550m NW	Status: Active Licence No: NW/069/0004/003 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE AT MANCHESTER METROPOLITAN UNIVERSITY Data Type: Point Name: Manchester Metropolitan University Easting: 383715 Northing: 396746	Annual Volume (m ³): 274115 Max Daily Volume (m ³): 751 Original Application No: NPS/WR/008077 Original Start Date: 20/09/2013 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 01/01/2015 Version End Date: -
-	1550m NW	Status: Active Licence No: NW/069/0004/003 Details: Heat Pump Direct Source: Ground Water - North West Region Point: BOREHOLE AT MANCHESTER METROPOLITAN UNIVERSITY Data Type: Point Name: Manchester Metropolitan University Easting: 383715 Northing: 396746	Annual Volume (m ³): 274115 Max Daily Volume (m ³): 751 Original Application No: NPS/WR/008077 Original Start Date: 20/09/2013 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 01/01/2015 Version End Date: -
-	1558m NW	Status: Active Licence No: NW/069/0006/003 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE 1 AT LOWER CHATHAM STREET Data Type: Point Name: Manchester Metropolitan University Easting: 384180 Northing: 397091	Annual Volume (m ³): 283240 Max Daily Volume (m ³): 1532 Original Application No: NPS/WR/015264 Original Start Date: 04/04/2014 Expiry Date: 31/03/2027 Issue No: 2 Version Start Date: 04/04/2014 Version End Date: -



ID	Location	Details	
-	1558m NW	Status: Active Licence No: NW/069/0006/003 Details: Heat Pump Direct Source: Ground Water - North West Region Point: BOREHOLE 1 AT LOWER CHATHAM STREET Data Type: Point Name: Manchester Metropolitan University Easting: 384180 Northing: 397091	Annual Volume (m ³): 283240 Max Daily Volume (m ³): 1532 Original Application No: NPS/WR/015264 Original Start Date: 04/04/2014 Expiry Date: 31/03/2027 Issue No: 2 Version Start Date: 04/04/2014 Version End Date: -
-	1628m W	Status: Historical Licence No: 2569007009 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: "BOREHOLE AT PREMISES, MOSS LANE WEST MANCHESTER" Data Type: Point Name: HYDES BREWERY LTD Easting: 383220 Northing: 395850	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 21/02/1966 Expiry Date: - Issue No: 101 Version Start Date: 07/10/2000 Version End Date: -
-	1628m W	Status: Historical Licence No: 2569007009 Details: Process water Direct Source: Ground Water - North West Region Point: "BOREHOLE AT PREMISES, MOSS LANE WEST MANCHESTER" Data Type: Point Name: HYDES BREWERY LTD Easting: 383220 Northing: 395850	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 21/02/1966 Expiry Date: - Issue No: 101 Version Start Date: 07/10/2000 Version End Date: -
-	1628m W	Status: Historical Licence No: 2569007009 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES, MOSS LANE WEST MANCHESTER Data Type: Point Name: HYDES BREWERY LTD Easting: 383220 Northing: 395850	Annual Volume (m ³): 66826.2 Max Daily Volume (m ³): 372.772 Original Application No: - Original Start Date: 21/02/1966 Expiry Date: - Issue No: 101 Version Start Date: 07/10/2000 Version End Date: -



ID	Location	Details	
-	1628m W	Status: Historical Licence No: 2569007009 Details: Process Water Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES, MOSS LANE WEST MANCHESTER Data Type: Point Name: HYDES BREWERY LTD Easting: 383220 Northing: 395850	Annual Volume (m ³): 66826.2 Max Daily Volume (m ³): 372.772 Original Application No: - Original Start Date: 21/02/1966 Expiry Date: - Issue No: 103 Version Start Date: 19/07/2018 Version End Date: -
-	1894m N	Status: Historical Licence No: 2569006001 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: "BOREHOLE AT PREMISES, BROADIE ST, ARDWICK, MANCHESTER" Data Type: Point Name: MOSELEY RUBBER CO LTD Easting: 385240 Northing: 397540	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 08/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 08/02/1966 Version End Date: -
-	1894m N	Status: Historical Licence No: 2569006001 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES, BROADIE ST, ARDWICK, MANCHESTER Data Type: Point Name: MOSELEY RUBBER CO LTD Easting: 385240 Northing: 397540	Annual Volume (m ³): 331858 Max Daily Volume (m ³): 909.2 Original Application No: - Original Start Date: 08/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 08/02/1966 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m

0

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.



5.8 Potable abstractions

Records within 2000m

0

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m

1

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination. Features are displayed on the Abstractions and Source Protection Zones map on [page 45 >](#)

ID	Location	Type	Description
1	On site	3	Total catchment

This data is sourced from the Environment Agency and Natural Resources Wales.

5.10 Source Protection Zones (confined aquifer)

Records within 500m

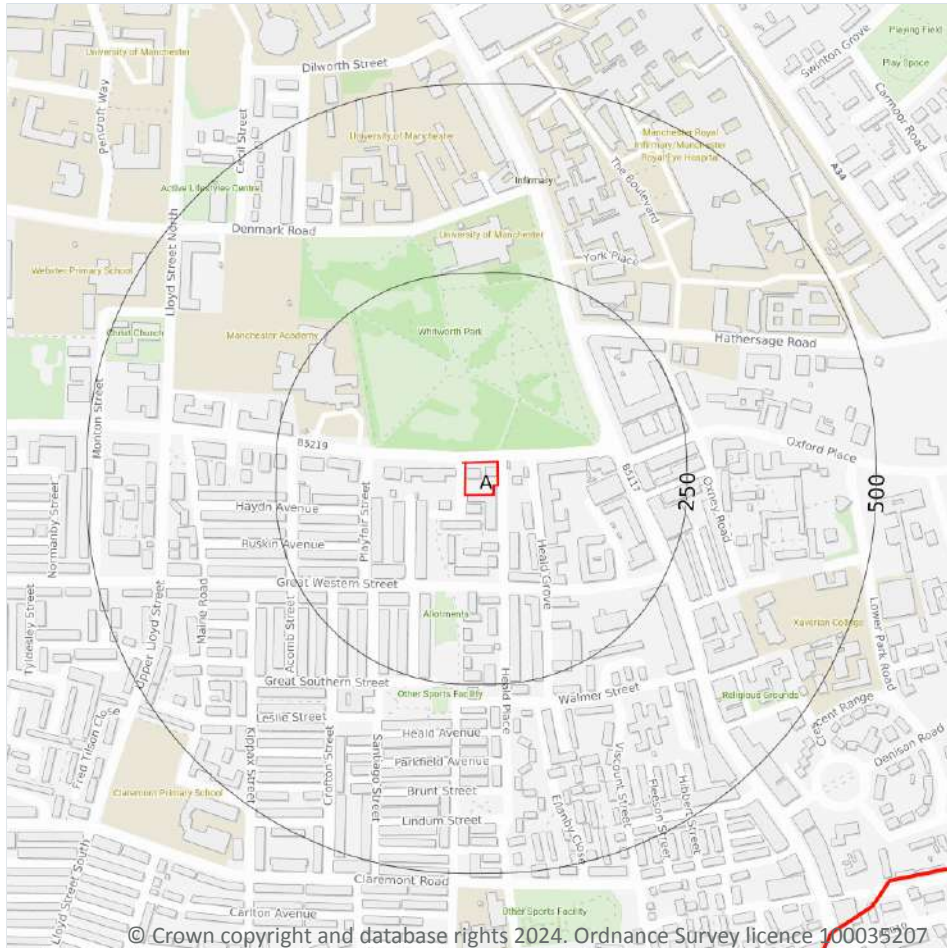
0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.



6 Hydrology



- Site Outline
- Search buffers in metres (m)
- Water Network (OS MasterMap)
- Surface water features (wider than 5m)
- Surface water features (narrower than 5m)
- ⋯ WFD River, canal and surface water transfer water bodies
- WFD Lake water bodies
- WFD Transitional and coastal water bodies
- WFD Surface water body catchments boundaries
- WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m

0

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m

0

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.



This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1
------------------------	----------

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on [page 52](#) >

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	On site	River	Irwell / Manchester Ship Canal (Irk to confluence with Upper Mers	GB112069061452	Croal Irwell	Irwell

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1
---------------------------	----------

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on [page 52](#) >

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	2886m NW	River	Irwell / Manchester Ship Canal (Irk to confluence with Upper Mers	GB112069061452 ↗	Moderate	Fail	Moderate	2019

This data is sourced from the Environment Agency and Natural Resources Wales.



6.5 WFD Groundwater bodies

Records on site

1

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on [page 52](#) >

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	On site	Manchester and East Cheshire Permo-Triassic Sandstone Aquifers	GB41201G101100 ↗	Poor	Poor	Poor	2019

This data is sourced from the Environment Agency and Natural Resources Wales.



7 River and coastal flooding

7.1 Risk of flooding from rivers and the sea

Records within 50m

0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m

0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m

0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.



7.4 Areas Benefiting from Flood Defences

Records within 250m

0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m

0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.



River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m

0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m

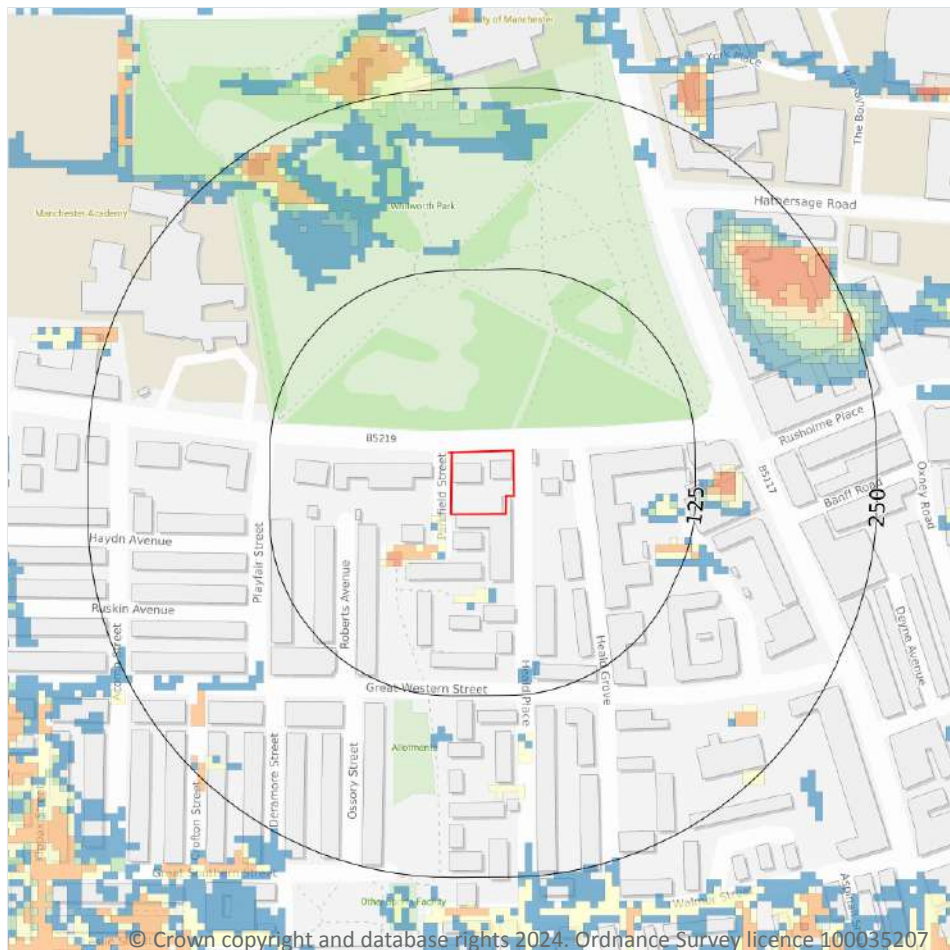
0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.



8 Surface water flooding



— Site Outline

Search buffers in metres (m)

1 in 1000 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site

Negligible

Highest risk within 50m

1 in 30 year, 0.3m - 1.0m

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on [page 58 >](#)

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.



The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Negligible
1 in 250 year	Negligible
1 in 100 year	Negligible
1 in 30 year	Negligible

This data is sourced from Ambiantal Risk Analytics.



9 Groundwater flooding



— Site Outline
Search buffers in metres (m)

- High
- Moderate - High
- Moderate
- Low
- Negligible

9.1 Groundwater flooding

Highest risk on site

Moderate

Highest risk within 50m

Moderate-High

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on [page 60 >](#)

This data is sourced from Ambiantal Risk Analytics.

10 Environmental designations

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m

0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m

0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m

0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m

0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.



10.5 National Nature Reserves (NNR)

Records within 2000m

0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m

0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m

0

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m

0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m

0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m

0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m

0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m

0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m

0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.



10.14 Potential Special Protection Areas (pSPA)

Records within 2000m

0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m

0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m

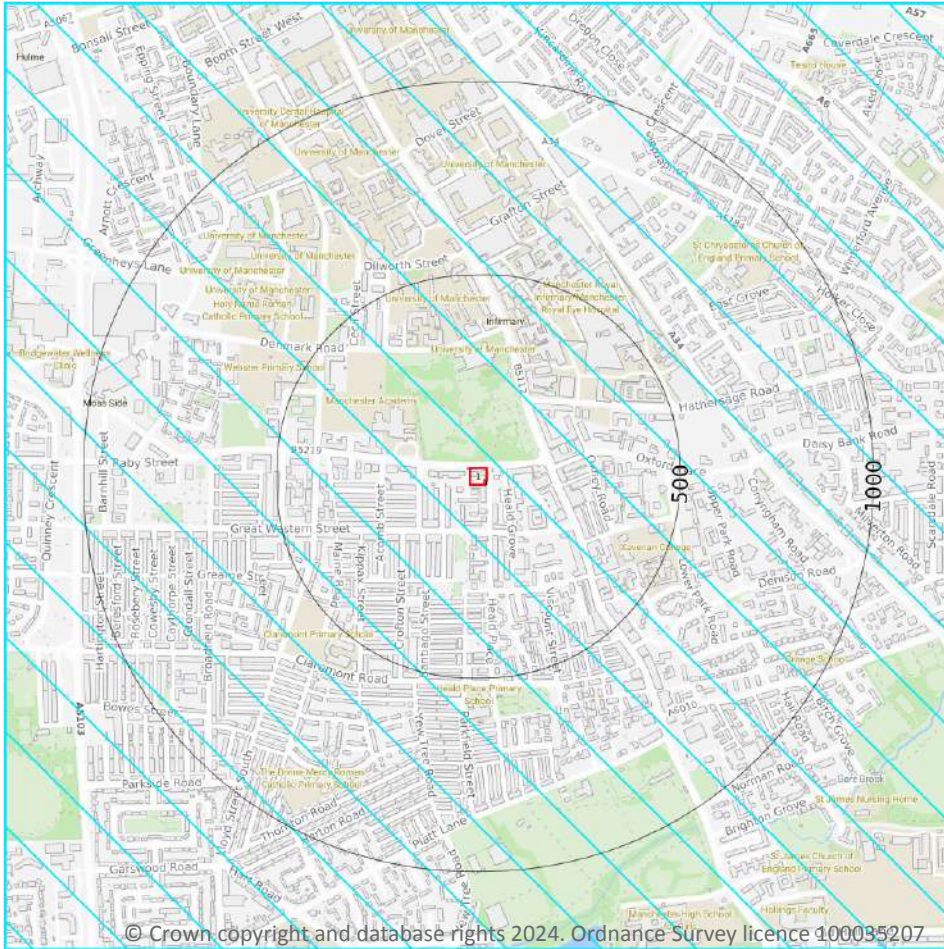
0

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

This data is sourced from Natural England and Natural Resources Wales.



SSSI Impact Zones and Units



- Site Outline
- Search buffers in metres (m)
- SSSI Impact Risk Zones
- SSSI Units
- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site

1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on [page 65 >](#)

ID	Location	Type of developments requiring consultation
1	On site	Air pollution - Livestock & poultry units with floorspace > 500m ² , slurry lagoons & digestate stores > 4000m ² . Combustion - General combustion processes > 50MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.



This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m

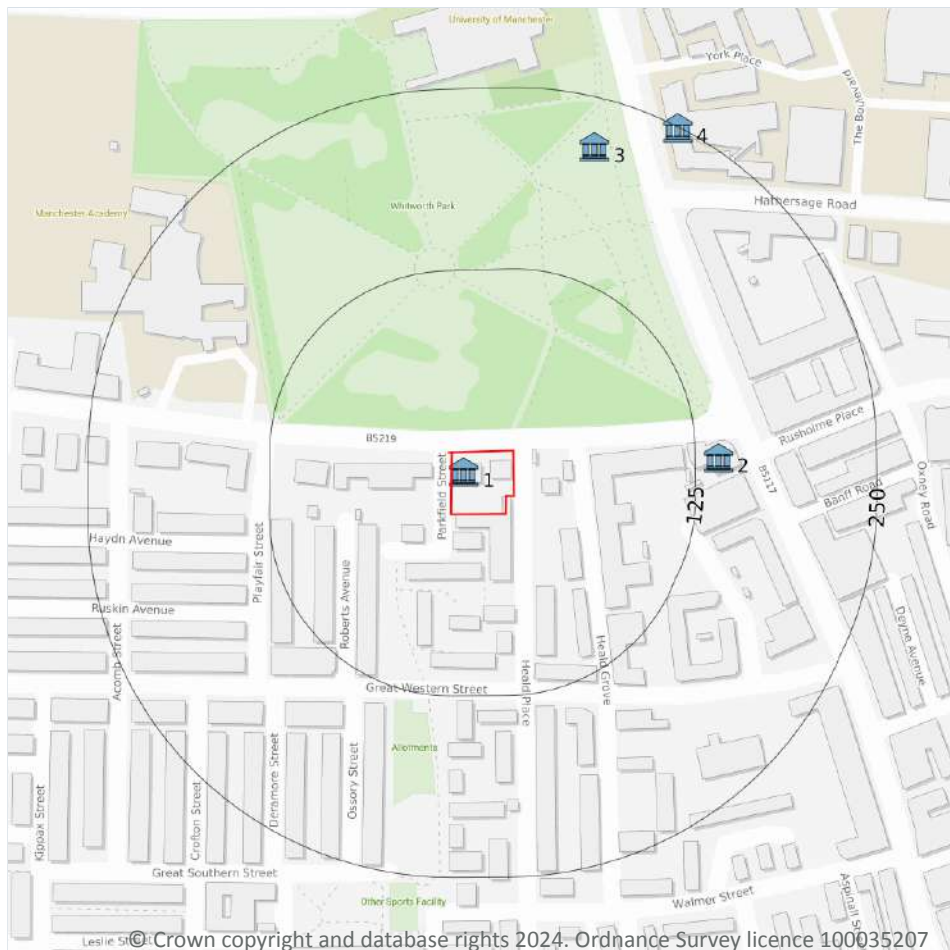
0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.



11 Visual and cultural designations



- Site Outline
- Search buffers in metres (m)
- Listed buildings
- Conservation areas
- Conservation areas - no data
- National Parks
- Areas of Outstanding Natural Beauty
- Registered parks and gardens
- Scheduled Monuments
- World Heritage Sites

11.1 World Heritage Sites

Records within 250m

0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.



11.2 Area of Outstanding Natural Beauty

Records within 250m

0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m

0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m

4

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on [page 67](#) >

ID	Location	Name	Grade	Reference Number	Listed date
1	On site	466 And 468, Moss Lane East	II	1197931	03/10/1974
2	141m E	Barclays Bank	II	1255024	03/10/1974
3	216m N	Edward VII Statue In Whitworth Park To South Of Whitworth Gallery	II	1271458	03/10/1974
4	249m NE	St Marys Hospital	II	1246550	06/06/1994

This data is sourced from Historic England, Cadw and Historic Environment Scotland.



11.5 Conservation Areas

Records within 250m

0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m

0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.7 Registered Parks and Gardens

Records within 250m

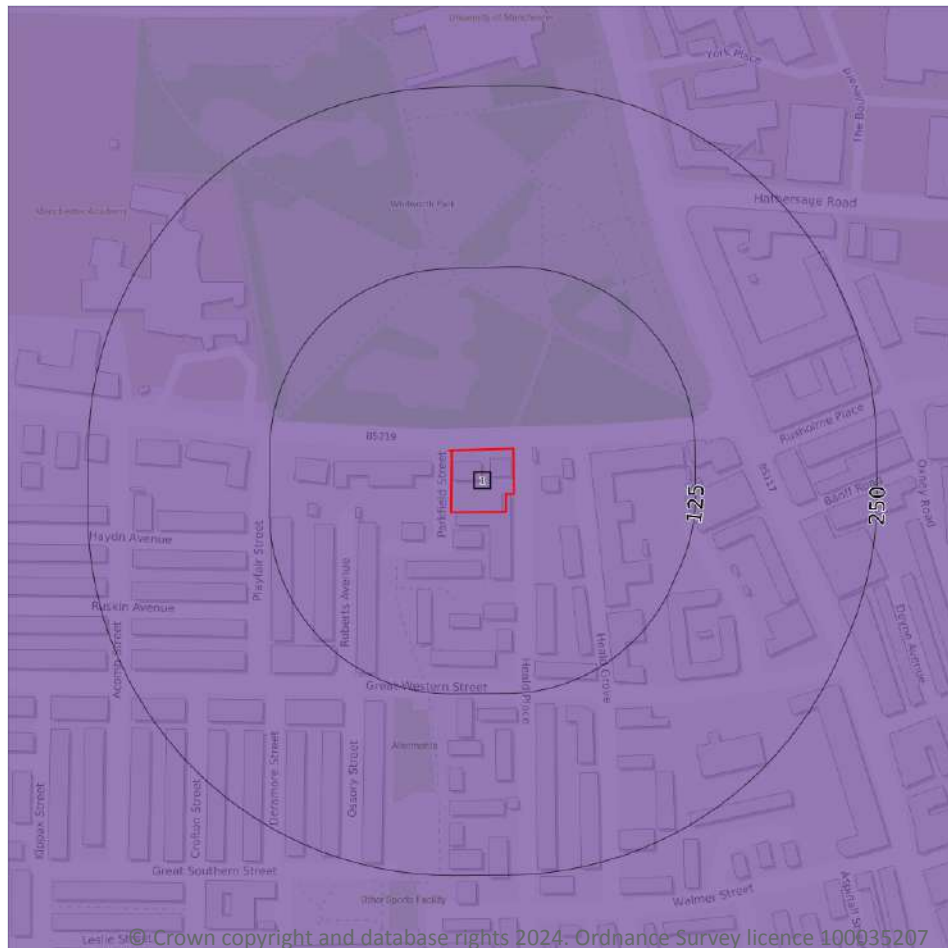
0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.



12 Agricultural designations



- Site Outline
- Search buffers in metres (m)
- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m

1

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on [page 70](#) >

ID	Location	Classification	Description
1	On site	Urban	-

This data is sourced from Natural England.



12.2 Open Access Land

Records within 250m

0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m

0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m

0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

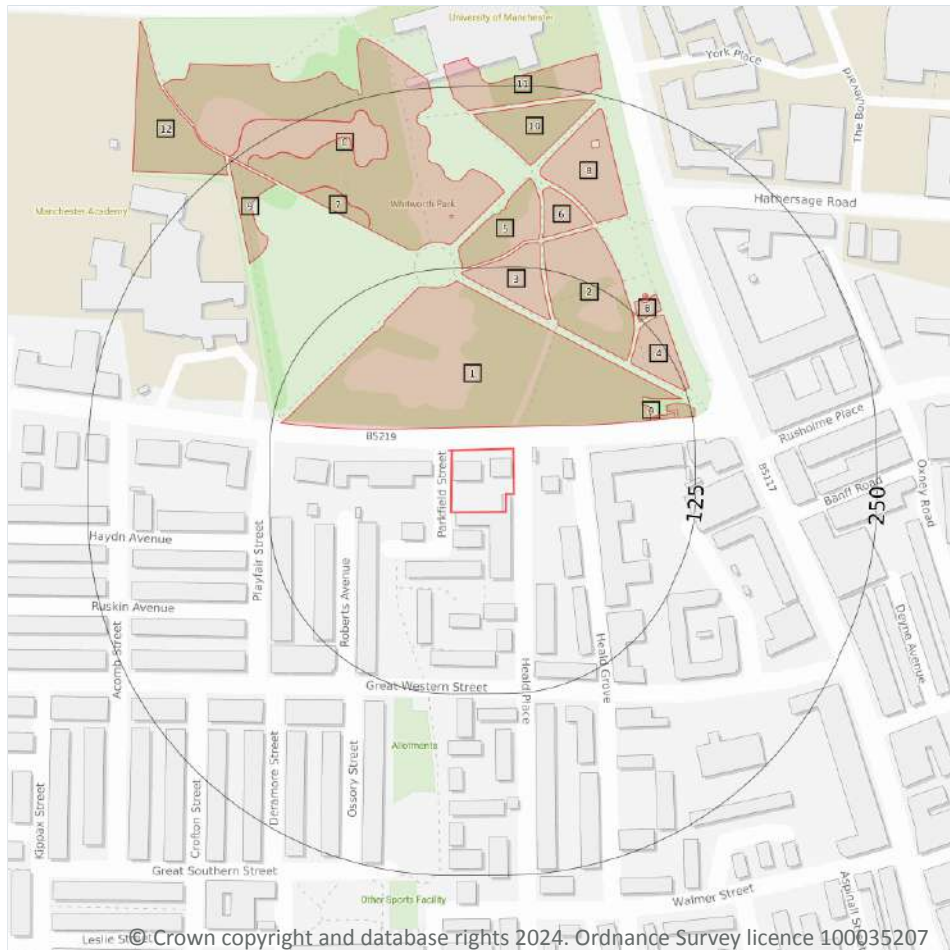
Records within 250m

0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations



- Site Outline
- Search buffers in metres (m)
- Priority Habitat Inventory
- Open Mosaic Habitat
- Limestone Pavement Orders
- Habitat Networks
- Primary Habitat
- Restorable Habitat
- Associated Habitats
- Habitat Restoration-Creation
- Network Enhancement Zone 1
- Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m

19

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on [page 72 >](#)

ID	Location	Main Habitat	Other habitats
1	15m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
2	90m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
3	92m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	98m E	Deciduous woodland	Main habitat: DWOOD (INV > 50%)



ID	Location	Main Habitat	Other habitats
A	99m E	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
4	100m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	109m E	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
B	123m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
5	125m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
B	136m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
C	140m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
6	146m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
7	163m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
8	166m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
9	189m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
10	196m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
C	204m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
11	234m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
12	244m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m

0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m

0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.



13.4 Limestone Pavement Orders

Records within 250m

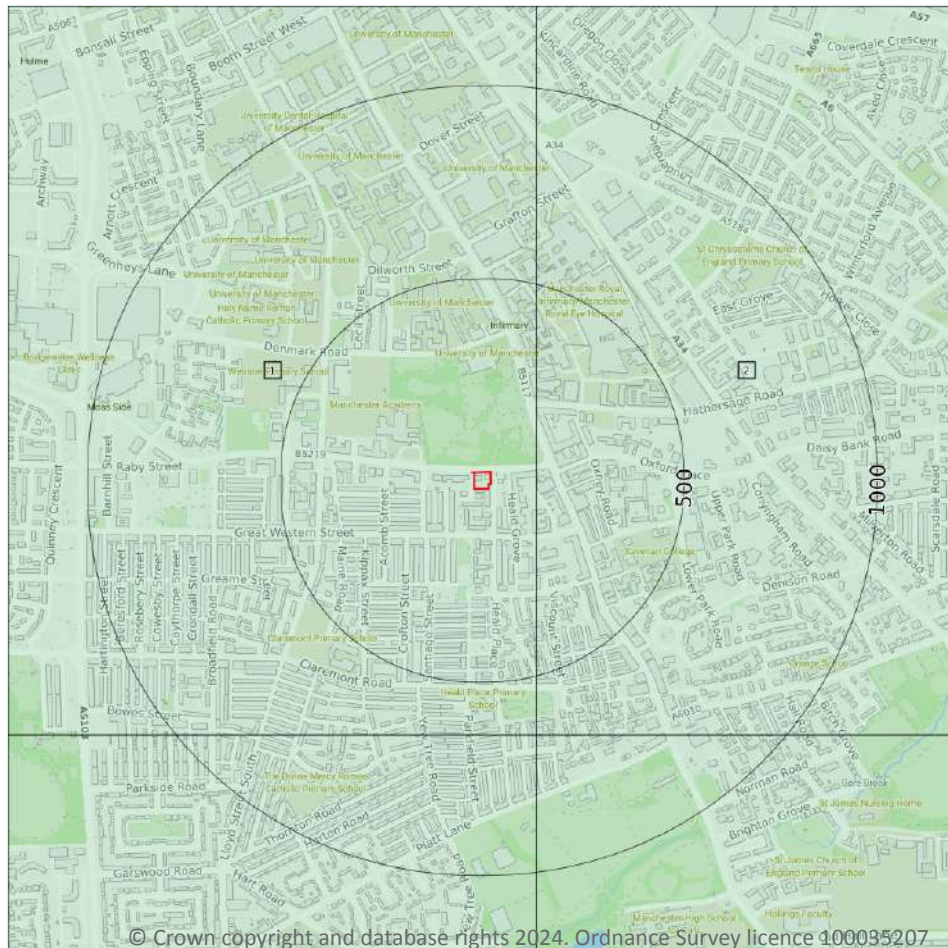
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Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.



14 Geology 1:10,000 scale - Availability



— Site Outline
Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m

2

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

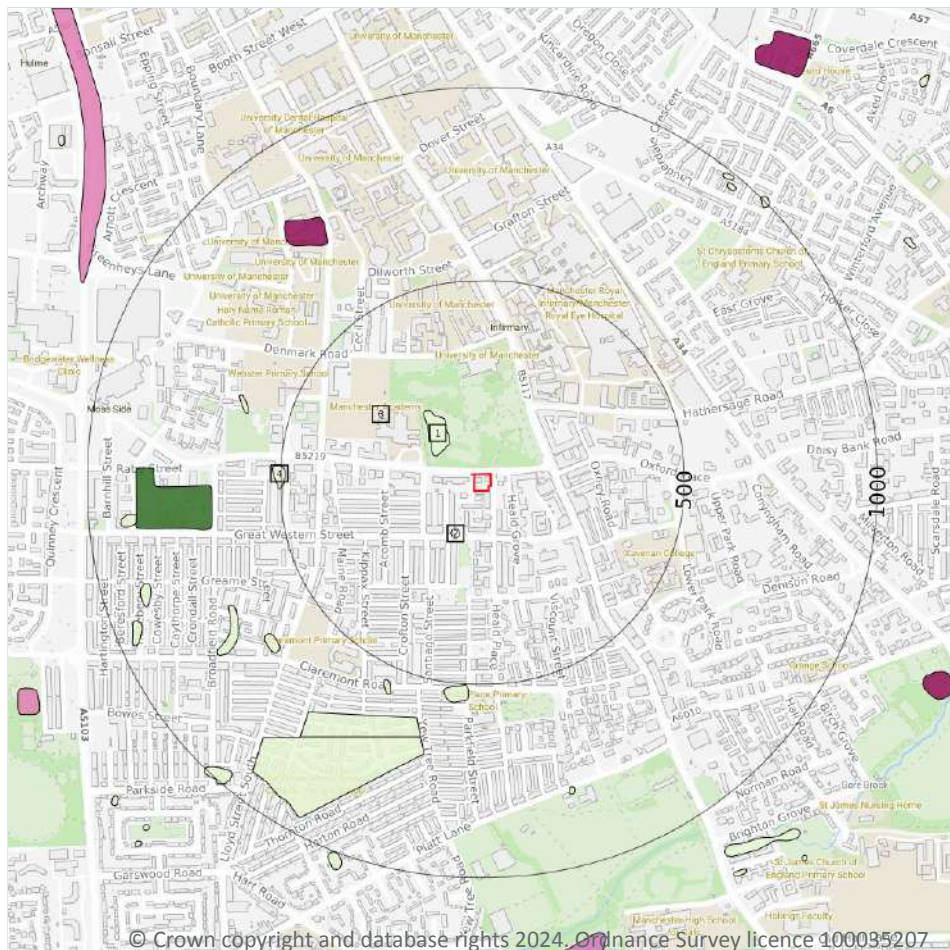
Features are displayed on the Geology 1:10,000 scale - Availability map on [page 75](#) >

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	No coverage	SJ89NW
2	118m E	Full	Full	Full	Full	SJ89NE

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Artificial and made ground



— Site Outline
Search buffers in metres (m)

- Reclaimed ground
- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m

4

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on [page 76](#) >

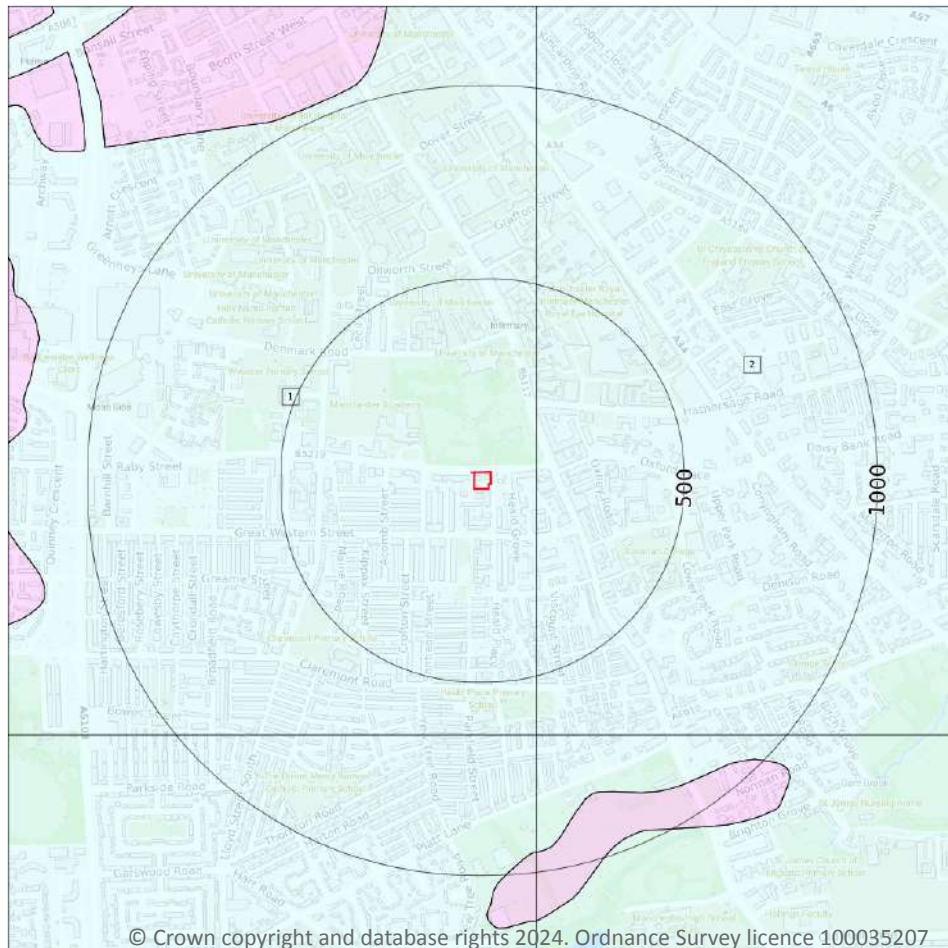
ID	Location	LEX Code	Description	Rock description
1	101m NW	WMGR-ARTDP	Infilled Ground	Artificial Deposit
2	108m SW	WMGR-ARTDP	Infilled Ground	Artificial Deposit
3	278m NW	WMGR-ARTDP	Infilled Ground	Artificial Deposit
4	489m W	WMGR-ARTDP	Infilled Ground	Artificial Deposit



This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Superficial



- Site Outline
- Search buffers in metres (m)
- Landslip (10k)
- Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m

2

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on [page 78 >](#)

ID	Location	LEX Code	Description	Rock description
1	On site	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
2	118m E	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton

This data is sourced from the British Geological Survey.



14.4 Landslip (10k)

Records within 500m

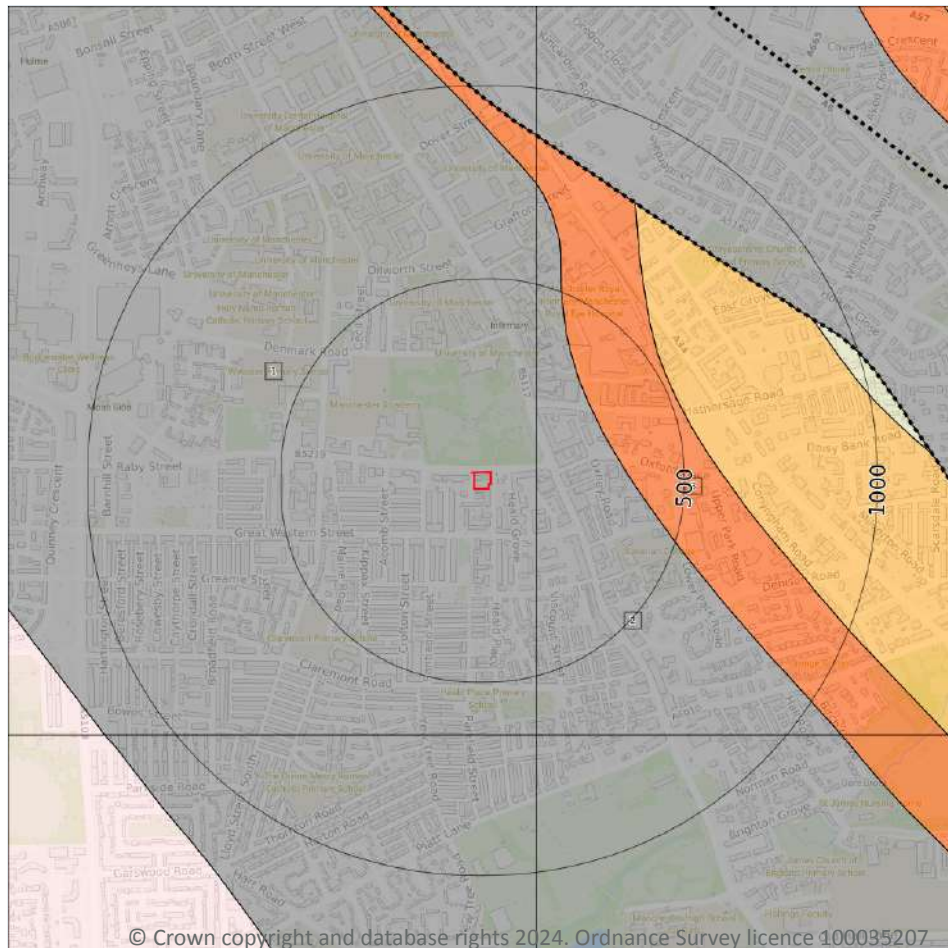
0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Bedrock



— Site Outline

Search buffers in metres (m)

.... Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m

3

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on [page 80](#) >

ID	Location	LEX Code	Description	Rock age
1	On site	CPB-SDST	Chester Pebble Beds Formation - Sandstone	Early Triassic Epoch
2	118m E	CPB-SDST	Chester Pebble Beds Formation - Sandstone	Early Triassic Epoch
3	306m NE	MM-MDST	Manchester Marls Formation - Mudstone	Late Permian Epoch [Obsolete name]



This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m

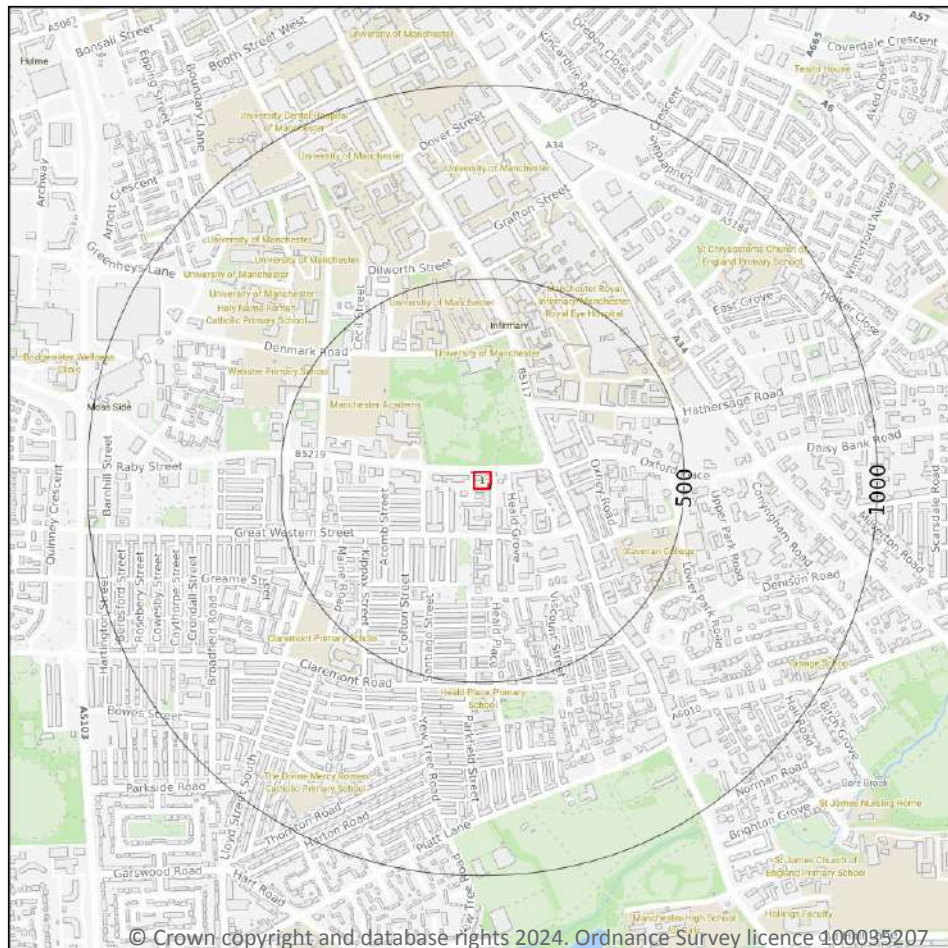
0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.



15 Geology 1:50,000 scale - Availability



— Site Outline
Search buffers in metres (m)

□ Geological map tile

15.1 50k Availability

Records within 500m

1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on [page 82](#) >

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	Full	Full	No coverage	EW085_manchester_v4

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

Records within 50m

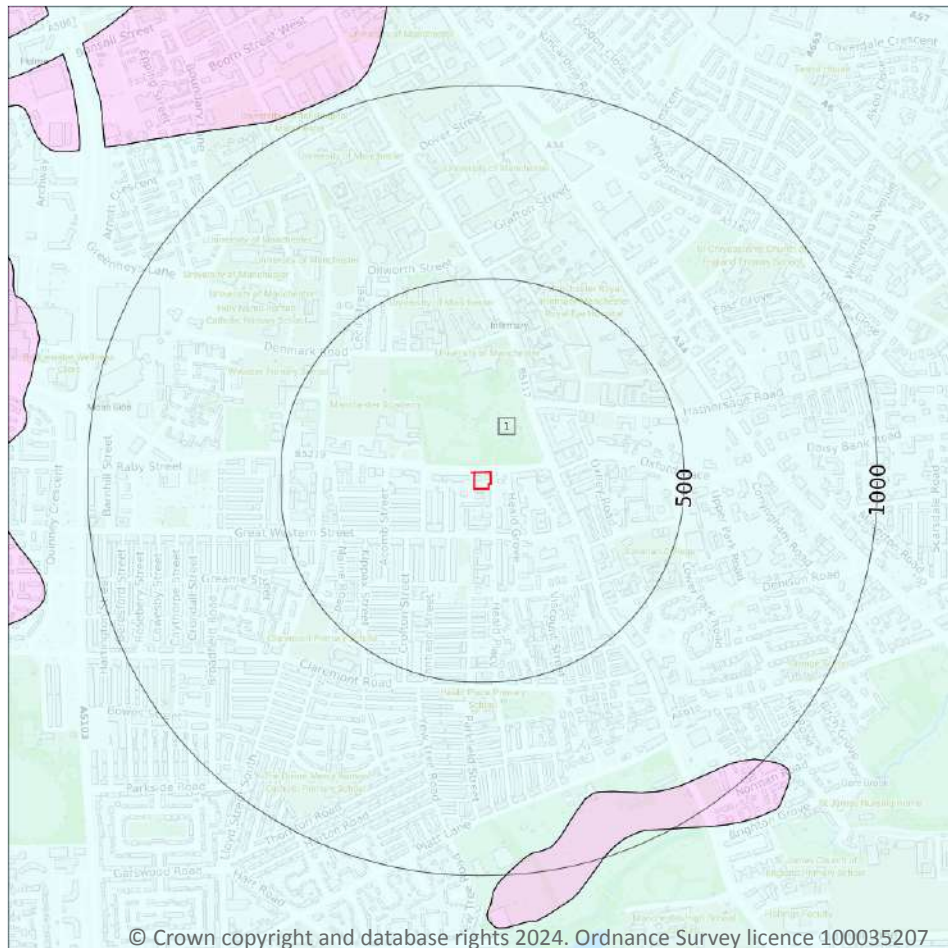
0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m

1

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on [page 84](#) >

ID	Location	LEX Code	Description	Rock description
1	On site	TILLD-DMTN	TILL, DEVANSIAN	DIAMICTON

This data is sourced from the British Geological Survey.



15.5 Superficial permeability (50k)

Records within 50m**1**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Mixed	High	Low

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m**0**

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

15.7 Landslip permeability (50k)

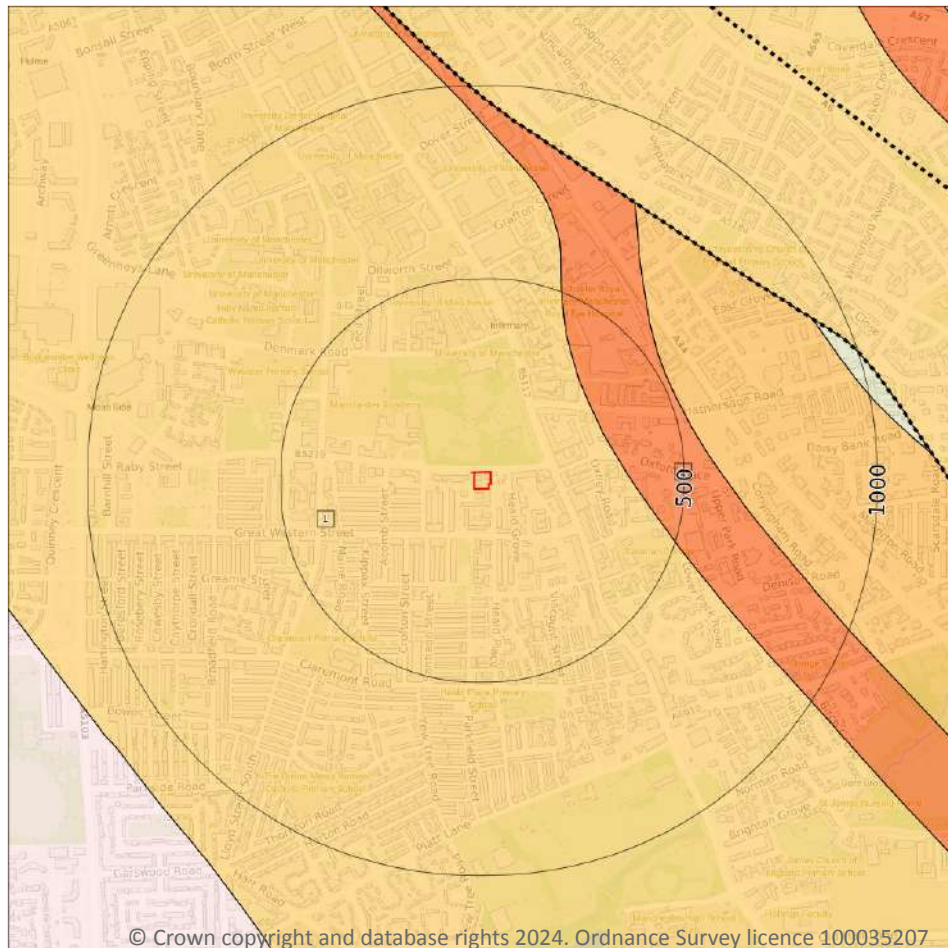
Records within 50m**0**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

..... Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m

2

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on [page 86 >](#)

ID	Location	LEX Code	Description	Rock age
1	On site	CHES-SDST	CHESTER FORMATION - SANDSTONE	OLENEKIAN
2	306m NE	MM-MDST	MANCHESTER MARLS FORMATION - MUDSTONE	-

This data is sourced from the British Geological Survey.



15.9 Bedrock permeability (50k)

Records within 50m**1**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Mixed	High	Moderate

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

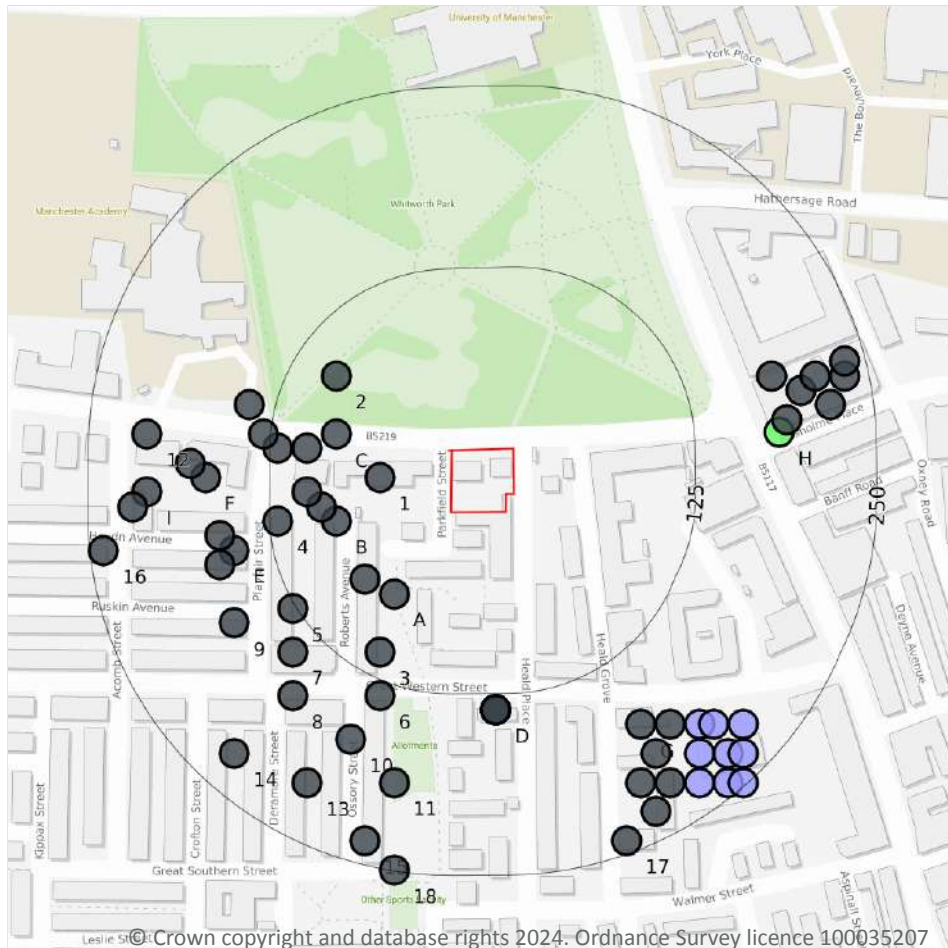
Records within 500m**0**

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.



16 Boreholes



— Site Outline
Search buffers in metres (m)

- Confidential
- 0 - 10m
- 10 - 30m
- 30m+
- Unknown

16.1 BGS Boreholes

Records within 250m

68

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

Features are displayed on the Boreholes map on [page 88](#) >

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	49m W	384790 395660	BIRLEY FIELDS HULME 8	-	Y	N/A
A	68m SW	384800 395580	BIRLEY FIELDS HULME 11	-	Y	N/A
A	75m SW	384780 395590	BIRLEY FIELDS HULME TP 9	-	Y	N/A



ID	Location	Grid reference	Name	Length	Confidential	Web link
B	79m W	384760 395630	BIRLEY FIELDS HULME TP 6	-	Y	N/A
C	80m W	384760 395690	BIRLEY FIELDS HULME TP 5	-	Y	N/A
B	89m W	384750 395640	BIRLEY FIELDS HULME 7	-	Y	N/A
2	95m NW	384760 395730	BIRLEY FIELDS HULME 4	-	Y	N/A
B	99m W	384740 395650	BIRLEY FIELDS HULME 7A	-	Y	N/A
C	100m W	384740 395680	BIRLEY FIELDS HULME TP 4	-	Y	N/A
3	108m SW	384790 395540	BIRLEY FIELDS HULME TP 10	-	Y	N/A
4	119m W	384720 395630	BIRLEY FIELDS HULME TP 7	-	Y	N/A
C	120m W	384720 395680	BIRLEY FIELDS HULME TP 3	-	Y	N/A
5	128m SW	384730 395570	BIRLEY FIELDS HULME 10	-	Y	N/A
C	130m W	384710 395690	BIRLEY FIELDS HULME 24	-	Y	N/A
6	135m SW	384790 395510	BIRLEY FIELDS HULME 13	-	Y	N/A
D	136m S	384870 395500	390 GREAT WESTERN STREET MOSS SIDE 2	-	Y	N/A
D	136m S	384870 395500	390 GREAT WESTERN STREET RUSHOLME 3	-	Y	N/A
D	136m S	384870 395500	390 GREAT WESTERN STREET MOSS SIDE 1	-	Y	N/A
D	136m S	384870 395500	390 GREAT WESTERN STREET MOSS SIDE 4	-	Y	N/A
D	136m S	384870 395500	390 GREAT WESTERN STREET RUSHOLME 5	-	Y	N/A
D	136m S	384870 395500	390 GREAT WESTERN STREET RUSHOLME 2	-	Y	N/A
D	136m S	384870 395500	390 GREAT WESTERN STREET MOSS SIDE 3	-	Y	N/A
D	136m S	384870 395500	390 GREAT WESTERN STREET RUSHOLME 1	-	Y	N/A
D	136m S	384870 395500	390 GREAT WESTERN STREET RUSHOLME 4	-	Y	N/A
D	136m S	384870 395500	390 GREAT WESTERN STREET RUSHOLME TP1	-	Y	N/A
C	143m W	384700 395710	BIRLEY FIELDS HULME 3	-	Y	N/A
7	145m SW	384730 395540	BIRLEY FIELDS HULME TP 11	-	Y	N/A
E	151m W	384690 395610	BIRLEY FIELDS HULME 6A	-	Y	N/A
E	160m W	384680 395620	BIRLEY FIELDS HULME 6	-	Y	N/A
E	163m W	384680 395600	BIRLEY FIELDS HULME TP 8	-	Y	N/A
8	167m SW	384730 395510	BIRLEY FIELDS HULME 12	-	Y	N/A



ID	Location	Grid reference	Name	Length	Confidential	Web link
9	167m SW	384690 395560	BIRLEY FIELDS HULME 9	-	Y	N/A
F	169m W	384670 395660	BIRLEY FIELDS HULME TP 2	-	Y	N/A
10	171m SW	384770 395480	BIRLEY FIELDS HULME TP 12	-	Y	N/A
G	173m SE	384970 395490	WALMER STREET MOSS SIDE 1	-	Y	N/A
F	180m W	384660 395670	BIRLEY FIELDS HULME 23	-	Y	N/A
H	183m E	385065 395691	MANCHESTER CORP. WILNSLOW ROAD	13.11	N	936439 ↗
H	185m E	385060 395730	WILMSLOW ROAD FALLOWFIELD WS1	-	Y	N/A
G	185m SE	384990 395490	WALMER STREET MOSS SIDE 2	-	Y	N/A
H	189m E	385070 395700	WILMSLOW ROAD FALLOWFIELD 1	-	Y	N/A
11	190m S	384800 395450	BIRLEY FIELDS HULME 16	-	Y	N/A
G	196m SE	384980 395470	WALMER STREET MOSS SIDE 3	-	Y	N/A
G	198m SE	385010 395490	WALMER STREET RUSHOLME TP A	2.0	N	937250 ↗
H	202m E	385080 395720	WILMSLOW ROAD FALLOWFIELD WS3	-	Y	N/A
G	205m SE	385020 395490	WALMER STREET RUSHOLME TP B	1.1	N	937251 ↗
G	208m SE	384970 395450	WALMER STREET MOSS SIDE 4	-	Y	N/A
I	209m W	384630 395650	BIRLEY FIELDS HULME 22	-	Y	N/A
12	210m W	384630 395690	BIRLEY FIELDS HULME 2	-	Y	N/A
13	211m SW	384740 395450	BIRLEY FIELDS HULME 15	-	Y	N/A
G	213m SE	385010 395470	WALMER STREET RUSHOLME TP D	2.8	N	937253 ↗
H	214m E	385090 395730	WILMSLOW ROAD FALLOWFIELD 2	-	Y	N/A
G	218m SE	384990 395450	WALMER STREET MOSS SIDE 5	-	Y	N/A
G	219m SE	385040 395490	WALMER STREET RUSHOLME TP C	2.8	N	937252 ↗
I	219m W	384620 395640	BIRLEY FIELDS HULME TP 1	-	Y	N/A
H	220m E	385100 395710	WILMSLOW ROAD FALLOWFIELD WS5	-	Y	N/A
14	223m SW	384690 395470	BIRLEY FIELDS HULME TP 15	-	Y	N/A
G	226m SE	385030 395470	WALMER STREET RUSHOLME 1	6.5	N	937249 ↗
G	229m SE	385010 395450	WALMER STREET RUSHOLME TP F	2.5	N	937255 ↗
G	231m SE	384980 395430	WALMER STREET MOSS SIDE 6	-	Y	N/A

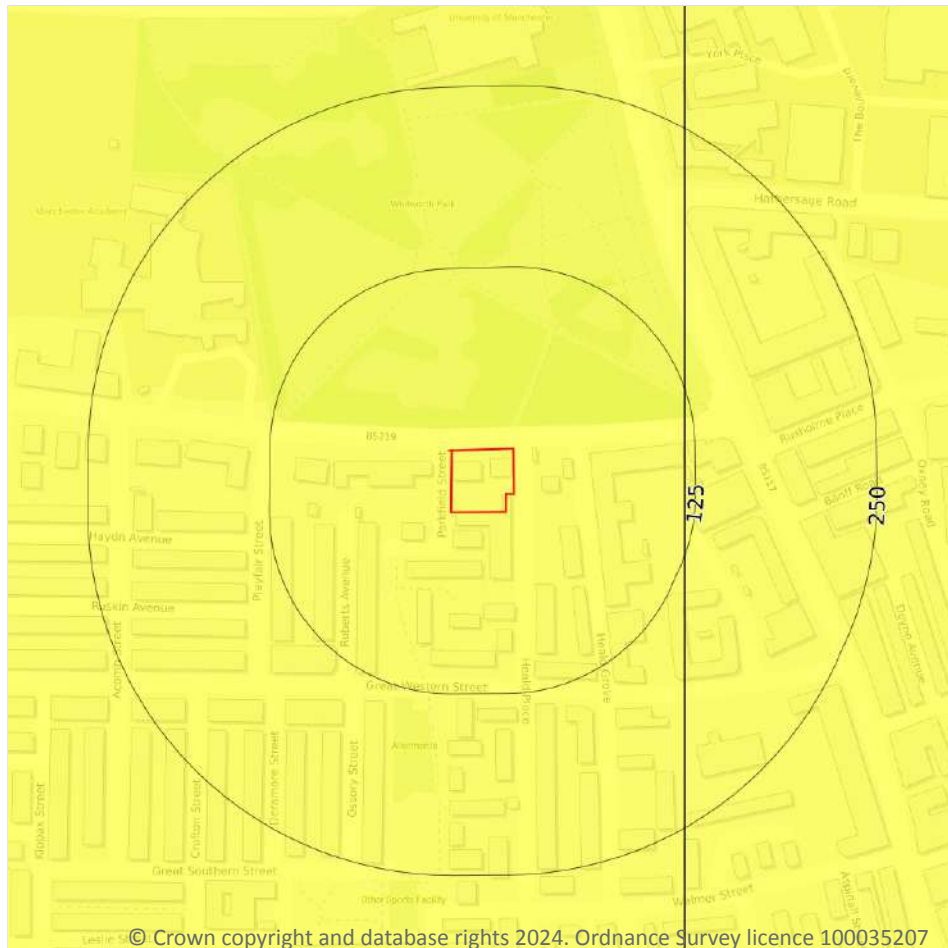


ID	Location	Grid reference	Name	Length	Confidential	Web link
G	233m SE	385040 395470	WALMER STREET RUSHOLME TP E	2.9	N	937254 ↗
H	233m E	385110 395730	WILMSLOW ROAD FALLOWFIELD WS4	-	Y	N/A
15	234m S	384780 395410	BIRLEY FIELDS HULME TP 13	-	Y	N/A
H	236m E	385110 395740	WILMSLOW ROAD FALLOWFIELD WS2	-	Y	N/A
16	241m W	384600 395610	BIRLEY FIELDS HULME 5	-	Y	N/A
17	241m S	384960 395410	WALMER STREET MOSS SIDE 7/7A	-	Y	N/A
G	241m SE	385030 395450	WALMER STREET RUSHOLME TP G	2.6	N	937256 ↗
G	248m SE	385040 395450	WALMER STREET RUSHOLME TP H	2.7	N	937257 ↗
18	249m S	384800 395390	BIRLEY FIELDS HULME 19	-	Y	N/A

This data is sourced from the British Geological Survey.



17 Natural ground subsidence - Shrink swell clays



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☒ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.1 Shrink swell clays

Records within 50m

1

The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

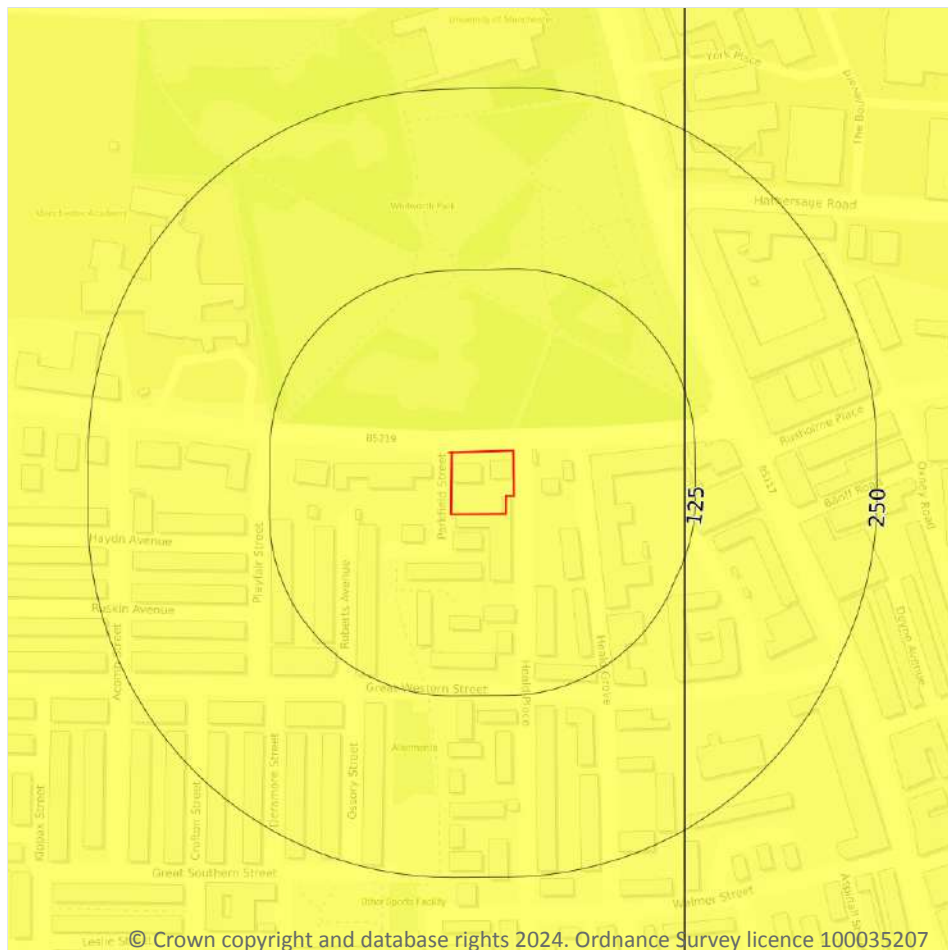
Features are displayed on the Natural ground subsidence - Shrink swell clays map on [page 92 >](#)

Location	Hazard rating	Details
On site	Very low	Ground conditions predominantly low plasticity.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Running sands



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.2 Running sands

Records within 50m

1

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

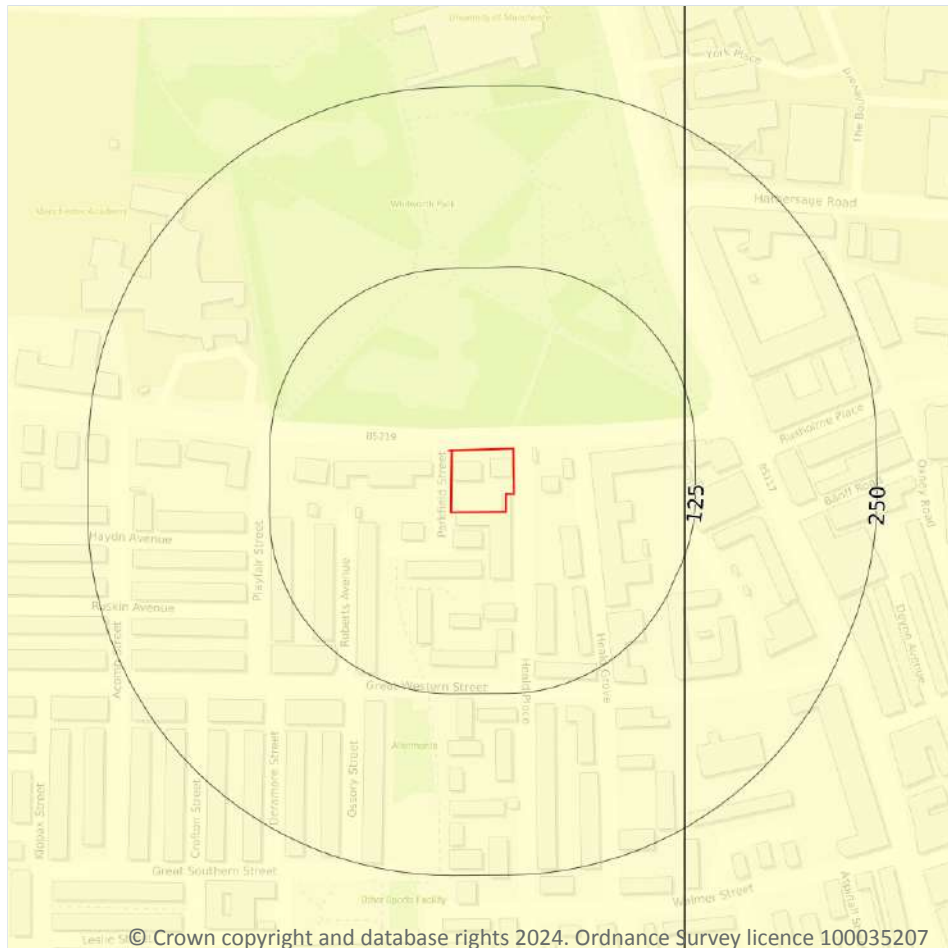
Features are displayed on the Natural ground subsidence - Running sands map on [page 93](#) >

Location	Hazard rating	Details
On site	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Compressible deposits



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.3 Compressible deposits

Records within 50m

1

The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

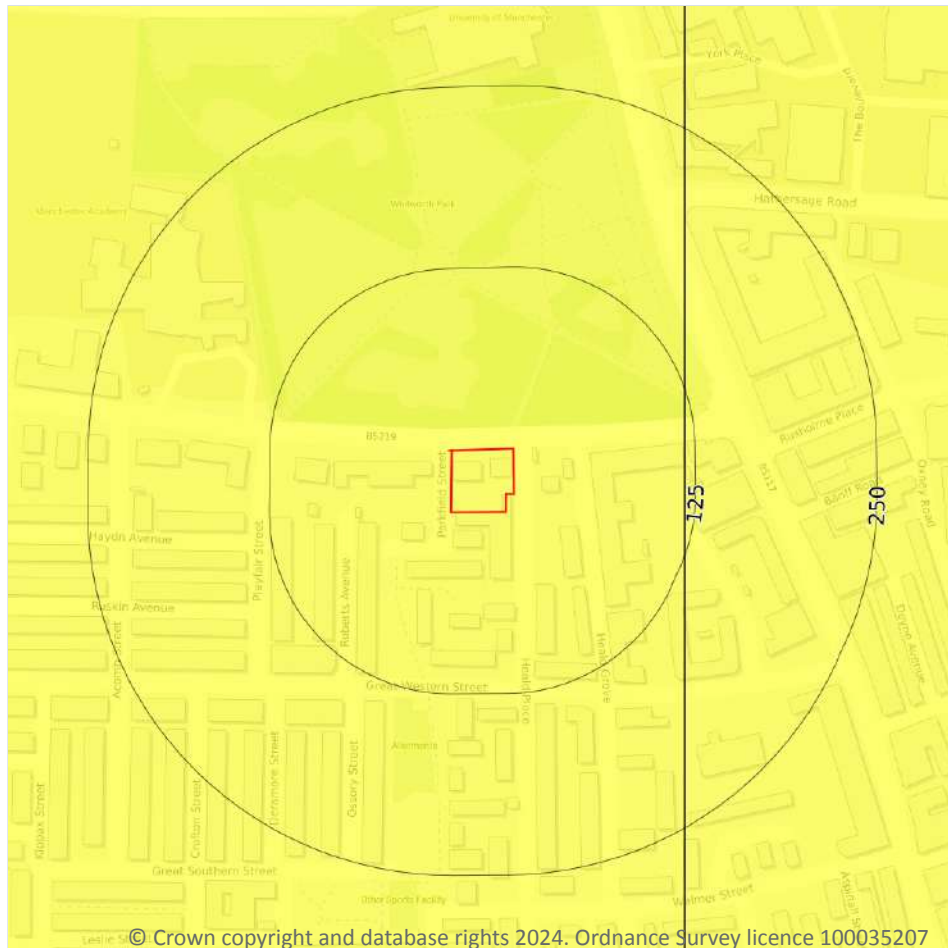
Features are displayed on the Natural ground subsidence - Compressible deposits map on [page 94](#) >

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Collapsible deposits



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☒ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.4 Collapsible deposits

Records within 50m

1

The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

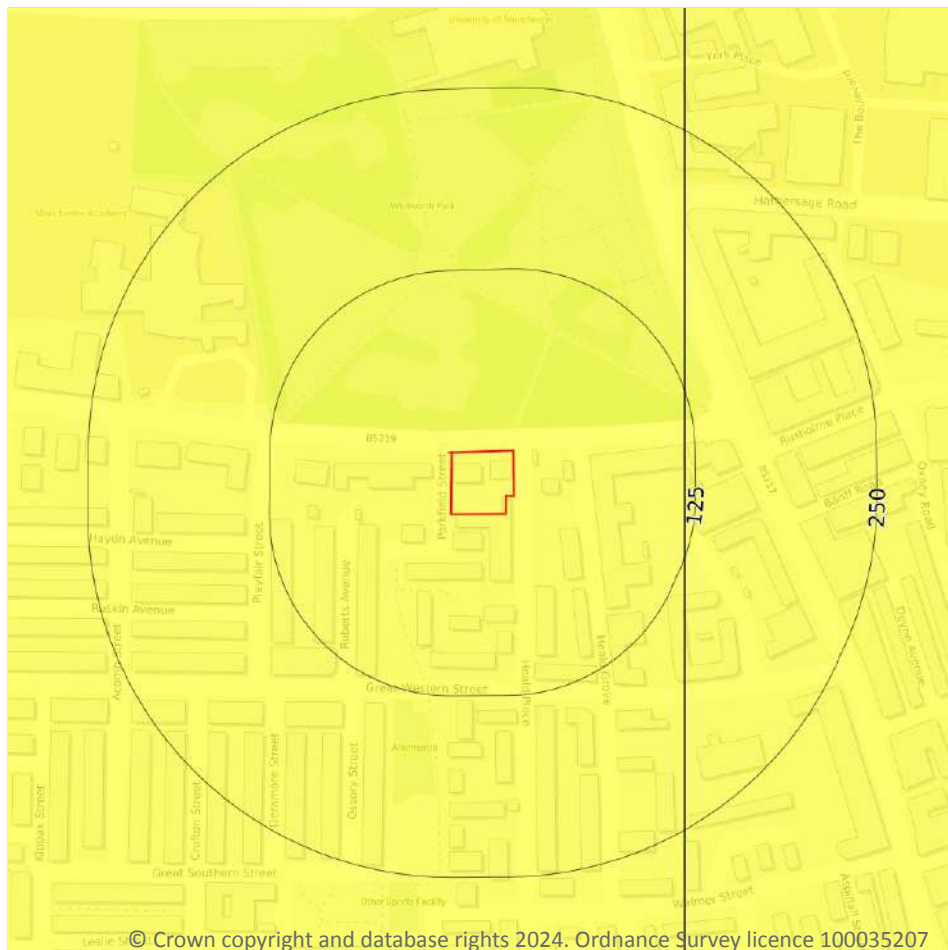
Features are displayed on the Natural ground subsidence - Collapsible deposits map on [page 95 >](#)

Location	Hazard rating	Details
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Landslides



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☒ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.5 Landslides

Records within 50m

1

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

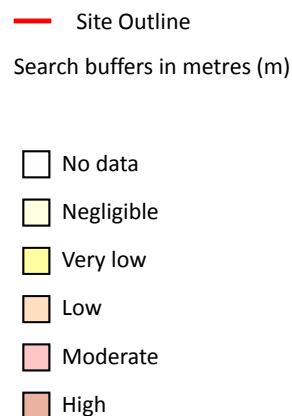
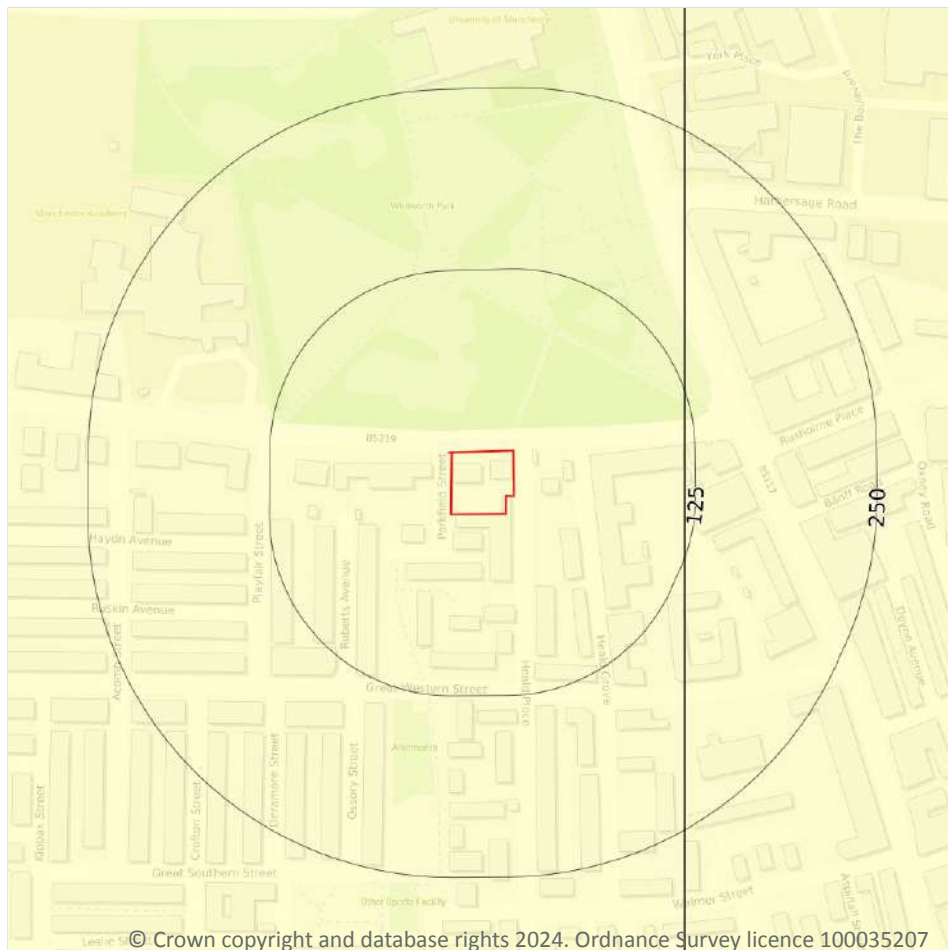
Features are displayed on the Natural ground subsidence - Landslides map on [page 96 >](#)

Location	Hazard rating	Details
On site	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Ground dissolution of soluble rocks



17.6 Ground dissolution of soluble rocks

Records within 50m

1

The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on [page 97](#)

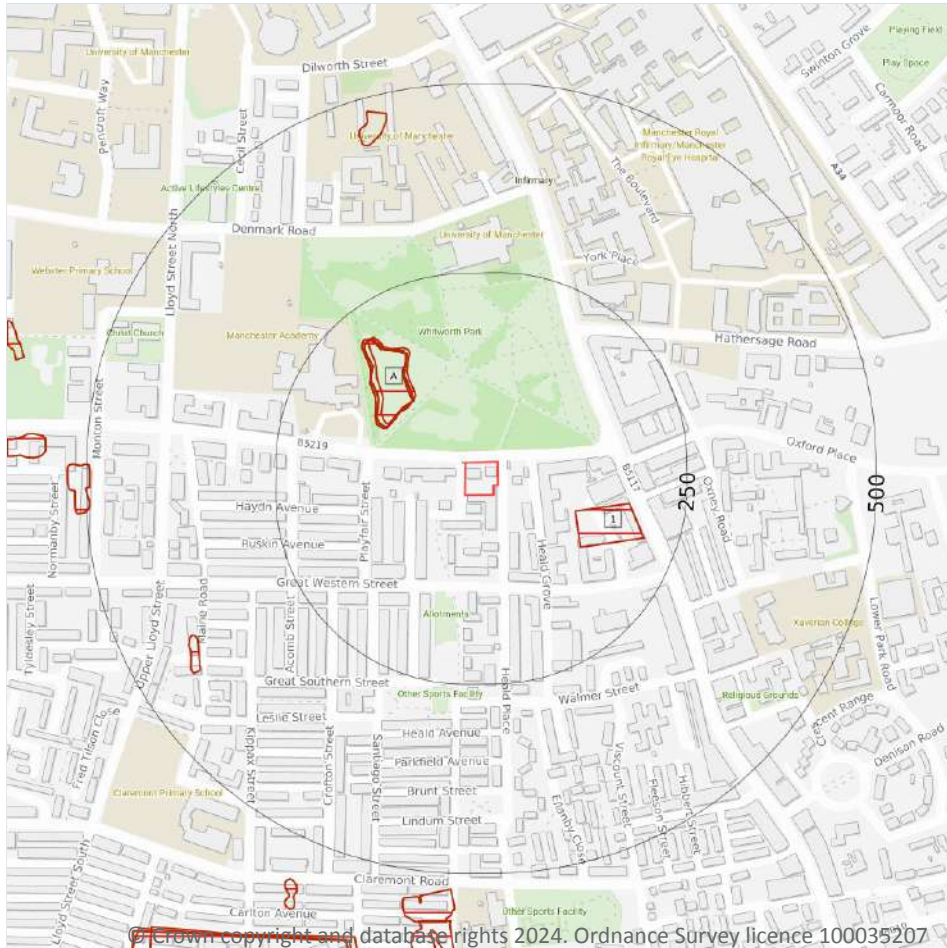
Location	Hazard rating	Details
On site	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.



This data is sourced from the British Geological Survey.



18 Mining and ground workings



- Site Outline
- Search buffers in metres (m)
- BritPits
- Surface ground workings
- Underground workings
- Underground mining extents
- Historical mineral planning areas
- TCA non-coal mining
- Non Coal Mining
- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

18.1 BritPits

Records within 500m

0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.2 Surface ground workings

Records within 250m

7

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining and ground workings map on [page 99](#) >

ID	Location	Land Use	Year of mapping	Mapping scale
A	105m NW	Pond	1938	1:10560
A	105m NW	Pond	1934	1:10560
A	105m NW	Pond	1915	1:10560
A	107m NW	Pond	1956	1:10560
A	107m NW	Pond	1905	1:10560
A	107m NW	Pond	1923	1:10560
1	108m E	Depository	1923	1:10560

This data is sourced from Ordnance Survey/Groundsure.

18.3 Underground workings

Records within 1000m

0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This data is sourced from Ordnance Survey/Groundsure.

18.4 Underground mining extents

Records within 500m

0

This data identifies underground mine workings that could present a potential risk, including adits and seam workings. These features have been identified from BGS Geological mapping and mine plans sourced from the BGS and various collections and sources.

This data is sourced from Groundsure.



18.5 Historical Mineral Planning Areas

Records within 500m

0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m

0

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 JPB mining areas

Records on site

1

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

Location	Details
On site	Whilst outside of an area where The Coal Authority have information on coal mining activities, Johnson Poole & Bloomer (JPB) may have information such as mining plans and maps held within their archive that have occurred within 1km of this property. Please note, the plans held by JPB may also relate to non-mining records. Further details and a quote for services (if appropriate) can be obtained by emailing this report to enquiries.gs@jpb.co.uk ↗.

This data is sourced from Johnson Poole and Bloomer.

18.8 The Coal Authority non-coal mining

Records within 500m

0

This data provides an indication of the potential zone of influence of recorded underground non-coal mining workings. Any and all analysis and interpretation of Coal Authority Data in this report is made by Groundsure, and is in no way supported, endorsed or authorised by the Coal Authority. The use of the data is restricted to the terms and provisions contained in this report. Data reproduced in this report may be the copyright of the Coal Authority and permission should be sought from Groundsure prior to any re-use.

This data is sourced from The Coal Authority.



18.9 Researched mining

Records within 500m**0**

This data indicates areas of potential mining identified from alternative or archival sources, including; BGS Geological paper maps, Lidar data, aerial photographs (from World War II onwards), archaeological data services, websites, Tithe maps, and various text/plans from collected books and reports. Some of this data is approximate and Groundsure have interpreted the resultant risk area and, where possible, specific areas of risk have been captured.

This data is sourced from Groundsure.

18.10 Mining record office plans

Records within 500m**0**

This dataset is representative of Mining Record Office and/or plan extents held by Groundsure and should be considered approximate. Where possible, plans have been located and any specific areas of risk they depict have been captured.

This data is sourced from Groundsure.

18.11 BGS mine plans

Records within 500m**0**

This dataset is representative of BGS mine plans held by Groundsure and should be considered approximate. Where possible, plans have been located and any specific areas of risk they depict have been captured.

This data is sourced from Groundsure.

18.12 Coal mining

Records on site**0**

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.13 Brine areas

Records on site**0**

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.



18.14 Gypsum areas

Records on site	0
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Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.15 Tin mining

Records on site	0
-----------------	---

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

18.16 Clay mining

Records on site	0
-----------------	---

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Ground cavities and sinkholes

19.1 Natural cavities

Records within 500m

0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

19.2 Mining cavities

Records within 1000m

0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

19.3 Reported recent incidents

Records within 500m

0

This data identifies sinkhole information gathered from media reports and Groundsure's own records. This data goes back to 2014 and includes relative accuracy ratings for each event and links to the original data sources. The data is updated on a regular basis and should not be considered a comprehensive catalogue of all sinkhole events. The absence of data in this database does not mean a sinkhole definitely has not occurred during this time.

This data is sourced from Groundsure.

19.4 Historical incidents

Records within 500m

0

This dataset comprises an extract of 1:10,560, 1:10,000, 1:2,500 and 1:1,250 scale historical Ordnance Survey maps held by Groundsure, dating back to the 1840s. It shows shakeholes, deneholes and other 'holes' as noted on these maps. Dene holes are medieval chalk extraction pits, usually comprising a narrow shaft with a number of chambers at the base of the shaft. Shakeholes are an alternative name for suffusion sinkholes, most commonly found in the limestone landscapes of North Yorkshire but also extensively noted around the Brecon Beacons National Park.

Not all 'holes' noted on Ordnance Survey mapping will necessarily be present within this dataset.



This data is sourced from Groundsure.

19.5 National karst database

Records within 500m

0

This is a comprehensive database of national karst information gathered from a wide range of sources. BGS have collected data on five main types of karst feature: Sinkholes, stream links, caves, springs, and incidences of associated damage to buildings, roads, bridges and other engineered works.

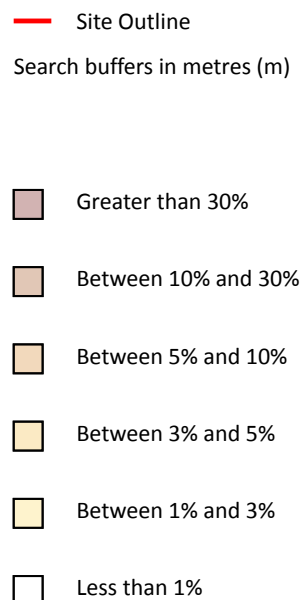
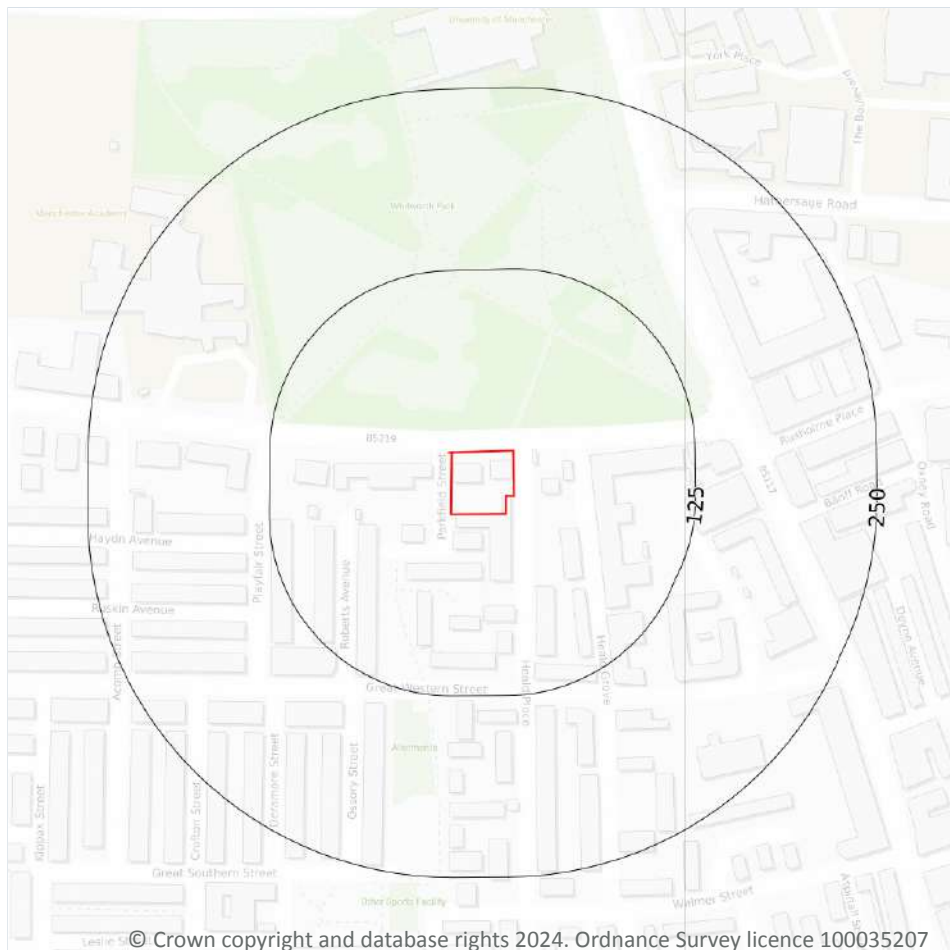
Since the database was set up in 2002 data covering most of the evaporite karst areas of the UK have now been added, along with data covering about 60% of the Chalk, and 35% of the Carboniferous Limestone outcrops. Many of the classic upland karst areas have yet to be included. Recorded so far are: Over 800 caves, 1300 stream sinks, 5600 springs, 10,000 sinkholes.

The database is not yet complete, and not all records have been verified. The absence of data does not mean that karst features are not present at a site. A reliability rating is included with each record.

This data is sourced from the British Geological Survey.



20 Radon



20.1 Radon

Records on site

1

The Radon Potential data classifies areas based on their likelihood of a property having a radon level at or above the Action Level in Great Britain. The dataset is intended for use at 1:50,000 scale and was derived from both geological assessments and indoor radon measurements (more than 560,000 records). A minimum 50m buffer should be considered when searching the maps, as the smallest detectable feature at this scale is 50m. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain (1:100,000 scale).

Features are displayed on the Radon map on [page 106 >](#)

Location	Estimated properties affected	Radon Protection Measures required
On site	Less than 1%	None



This data is sourced from the British Geological Survey and UK Health Security Agency.



21 Soil chemistry

21.1 BGS Estimated Background Soil Chemistry

Records within 50m

1

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km². In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km²; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 - 25 mg/kg	No data	100 - 200 mg/kg	60 - 120 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg

This data is sourced from the British Geological Survey.

21.2 BGS Estimated Urban Soil Chemistry

Records within 50m

8

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km²).

Location	Arsenic (mg/kg)	Bioaccessible Arsenic (mg/kg)	Lead (mg/kg)	Bioaccessible Lead (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Nickel (mg/kg)	Tin (mg/kg)
On site	25	4.4	100	69	0.7	89	38	29	9
17m E	26	4.6	93	64	0.6	99	34	29	8
20m NE	27	4.7	124	85	0.6	82	44	31	11
27m NE	27	4.7	115	79	0.6	96	40	31	11
36m S	23	4	101	69	0.7	94	39	27	9
39m W	25	4.4	107	74	0.7	89	42	29	11
43m SE	23	4	91	63	0.6	99	33	27	8



Location	Arsenic (mg/kg)	Bioaccessible Arsenic (mg/kg)	Lead (mg/kg)	Bioaccessible Lead (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Nickel (mg/kg)	Tin (mg/kg)
45m NW	27	4.7	125	86	0.7	82	45	31	12

This data is sourced from the British Geological Survey.

21.3 BGS Measured Urban Soil Chemistry

Records within 50m

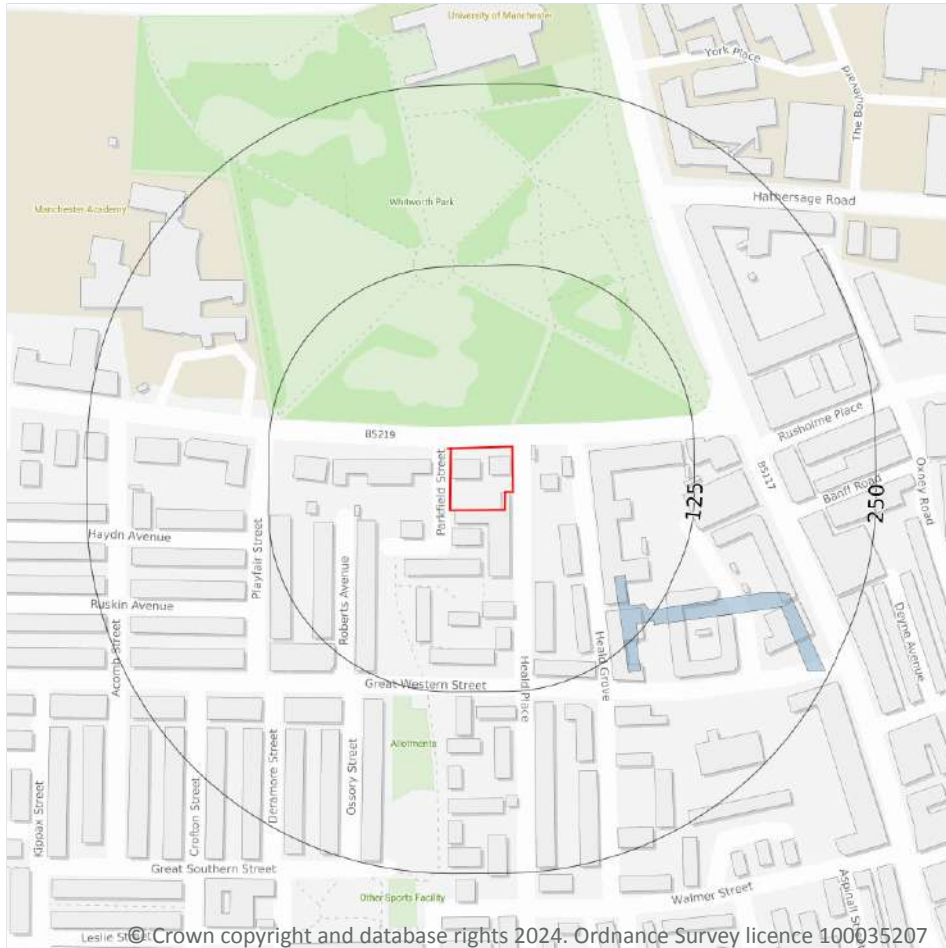
0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km².

This data is sourced from the British Geological Survey.



22 Railway infrastructure and projects



- Site Outline
- Search buffers in metres (m)**
- C1 Crossrail 1 Stations
- Crossrail 1 Route
- C2 Crossrail 2 Stations
- Crossrail 2 Route
- Crossrail 2 Worksites
- Crossrail 2 Safeguarding
- Crossrail 2 Headhouses
- Railway stations
- Active railways
- Active tunnels
- Abandoned railways
- Historic railways
- Historic tunnels
- Underground stations
- Underground Lines
- Royal Mail tunnels
- HS2 optimised route
- HS2 Stations
- HS2 Depots
- HS2 Surface Safeguarding
- HS2 Subsurface Safeguarding

22.1 Underground railways (London)

Records within 250m

0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

22.2 Underground railways (Non-London)

Records within 250m

0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.



This data is sourced from publicly available information by Groundsure.

22.3 Railway tunnels

Records within 250m

0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

22.4 Historical railway and tunnel features

Records within 250m

1

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on [page 110 >](#)

Location	Land Use	Year of mapping	Mapping scale
88m SE	Tramway Sidings	1893	2500

This data is sourced from Ordnance Survey/Groundsure.

22.5 Royal Mail tunnels

Records within 250m

0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

22.6 Historical railways

Records within 250m

0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.



22.7 Railways

Records within 250m**0**

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

22.8 Crossrail 1

Records within 500m**0**

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

22.9 Crossrail 2

Records within 500m**0**

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

22.10 HS2

Records within 500m**0**

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 Ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see <https://www.groundsure.com/sources-reference> ↗.

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Client Ref: P23-483-SA
Report Ref: GS-M6R-A9R-H3Q-S7H
Grid Ref: 384860, 395658

Map Name: 1056 Scale Town Plan

Map date: 1848

Scale: 1:1,056

Printed at: 1:1,056



Surveyed N/A
Revised N/A
Edition 1848
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Client Ref: P23-483-SA
Report Ref: GS-M6R-A9R-H3Q-S7H
Grid Ref: 384860, 395658

Map Name: County Series

Map date: 1881

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1881
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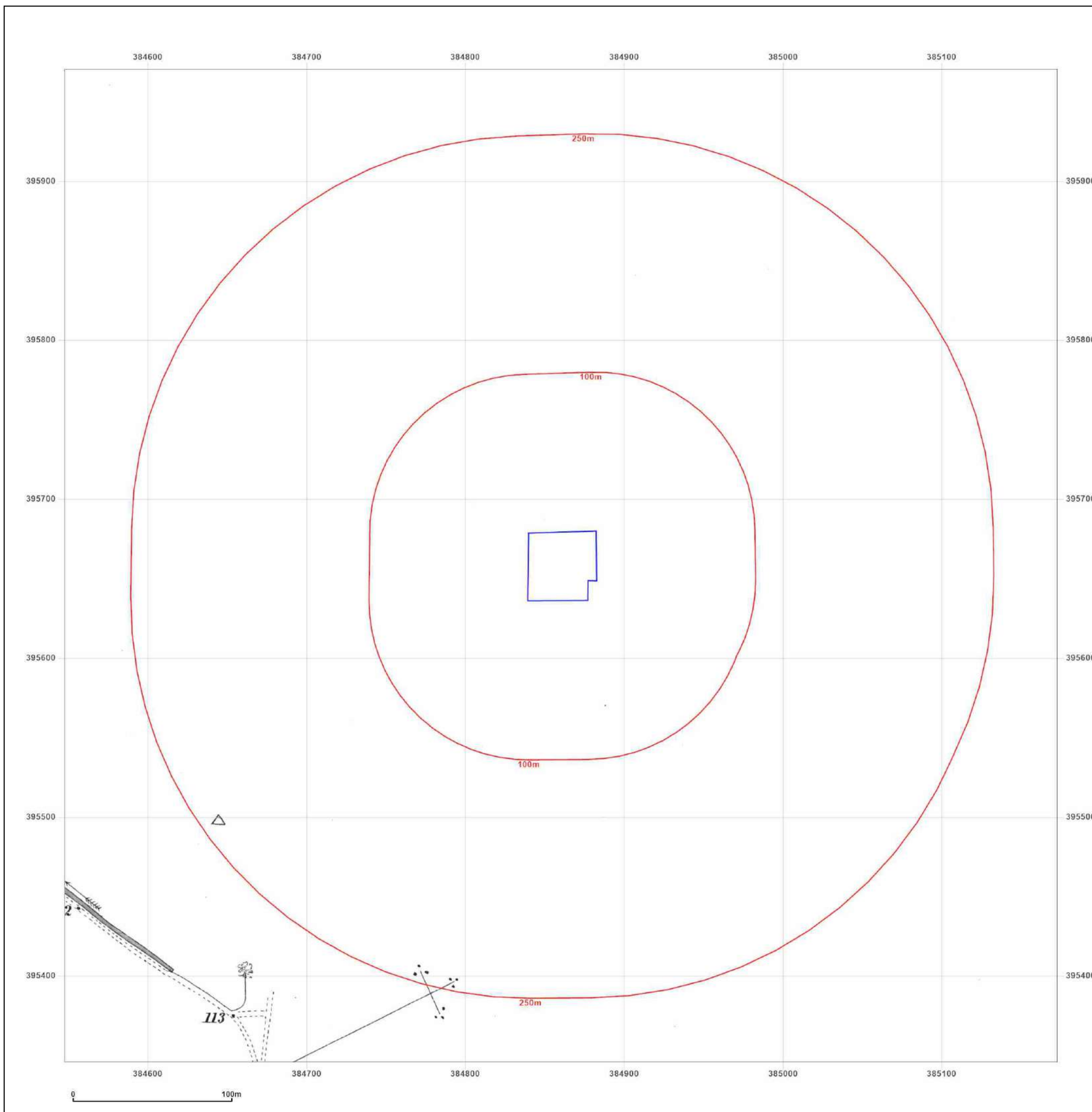


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Grid Ref: 384860, 395658

Map Name: County Series Town Plan

Map date: 1891

Scale: 1:500

Printed at: 1:1,000



Surveyed 1891
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Grid Ref: 384860, 395658

Map Name: County Series

Map date: 1893

Scale: 1:2,500

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Grid Ref: 384860, 395658

Map Name: County Series

Map date: 1908

Scale: 1:2,500

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Grid Ref: 384860, 395658

Map Name: County Series

Map date: 1922

Scale: 1:2,500

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Report Ref: GS-M6R-A9R-H3Q-S7H
Grid Ref: 384860, 395658

Map Name: County Series

Map date: 1933

Scale: 1:2,500

Printed at: 1:2,500



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Client Ref: P23-483-SA
Report Ref: GS-M6R-A9R-H3Q-S7H
Grid Ref: 384860, 395658

Map Name: National Grid

Map date: 1949-1950

Scale: 1:1,250

Printed at: 1:2,000



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Surveyed 1950 Revised 1950 Edition N/A Copyright N/A Levelled 1928	Surveyed 1950 Revised 1950 Edition N/A Copyright 1950 Levelled 1928



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