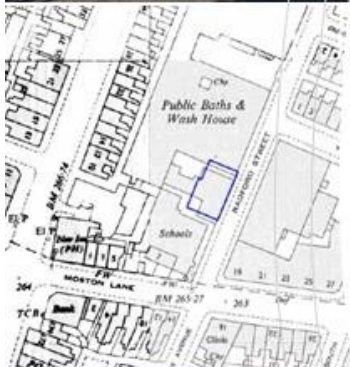




EARTH ENVIRONMENTAL
& GEOTECHNICAL

GeoEnvironmental Desk Study

The Manchester College
Harpurhey
Manchester

August 2020

On behalf of

The Manchester College

Earth Environmental & Geotechnical Ltd
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**THE MANCHESTER COLLEGE
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FOR
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Report No. A3545/20

August 2020

Report Title:	Manchester College, Harpurhey Phase I GeoEnvironmental Desk Study
Report Reference:	A3545/20
Client:	The Manchester College
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1.0 INTRODUCTION

Appointment

- 1.1 Earth Environmental & Geotechnical Ltd has been commissioned by GRD Building Contractors Ltd, on behalf of The Manchester College (the Client), to undertake a Phase I GeoEnvironmental Desk Study for the proposed development on the land at The Manchester College, Harpurhey.
- 1.2 It is understood that the Client wishes to construct a new cold store.
- 1.3 Existing vehicle access will be retained.
- 1.4 A proposed development plan for the site is shown in Figure 1 below.

Figure 1 Proposed Development Plan



Objective

- 1.5 The purpose of the Desk Study is to collate available geological and environmental data for the site (and its environment) and provide a preliminary geotechnical and geo-environmental appraisal, with a site-specific conceptual model. This enables a preliminary assessment of geo-environmental risks to be undertaken and, if necessary, provides information for the design of a Phase 2 Ground Investigation.

Scope

- 1.6 The Phase I Environmental Desk Study comprises of a site reconnaissance visit and a review of the following information sources, some of which was provided by the client.
- British Geological Survey online maps.
 - Google Earth imagery.
 - Environment Agency online mapping data.
 - Historical Ordnance Survey maps.
 - The site and surrounding areas environmental, geological and mining data presented in the site specific GroundSure Reports (Appendix 1).
 - Coal Authority Interactive Viewer.
 - Manchester City Council Planning Portal.

2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site is located in Harpurhey, Manchester, Northwest England approximately 4.11km from Manchester City Centre. The approximate National Grid Reference for the centre of the site is SD 86023 01956 (X: 386023, Y: 401956) with the closest postcode being M9 4AF.
- 2.2 The site is a near rectangular shaped parcel of land with current access via Hemsley Street South to the southeast. The maximum dimensions of the proposed site are 18m northeast to southwest and 12m northwest to southeast. The site occupies an area of approximately 0.02Ha.
- 2.3 The site is currently part of the college and comprises pavement, road and a substation.
- 2.4 The general surrounding area comprises predominantly of residential dwellings with the immediate surroundings comprising the rest of the college campus with Hemsley Street South to the southeast.
- 2.5 A location plan is shown below as Figure 2, together with a recent site photograph as Figure 3 (overleaf).

Figure 2 Site Location Plan

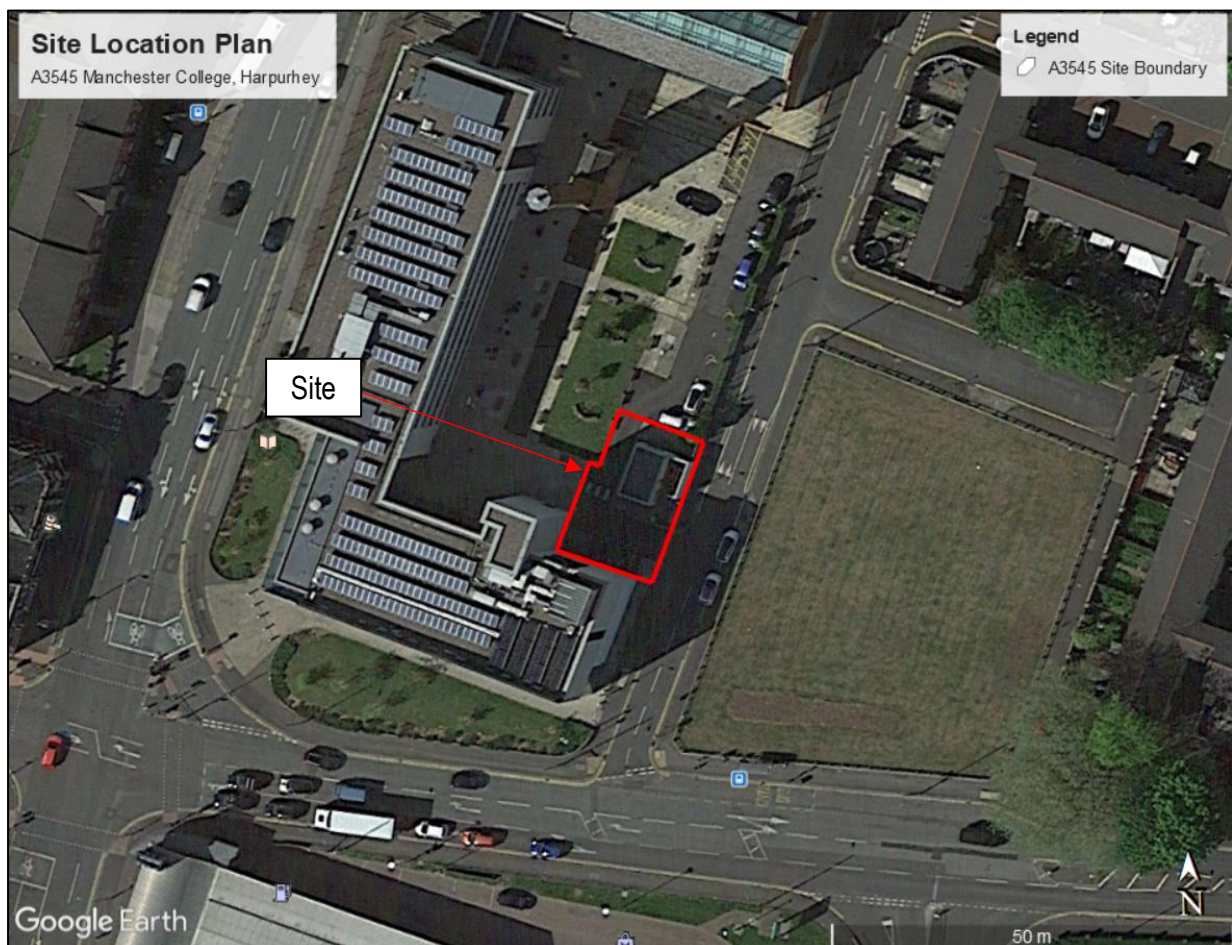


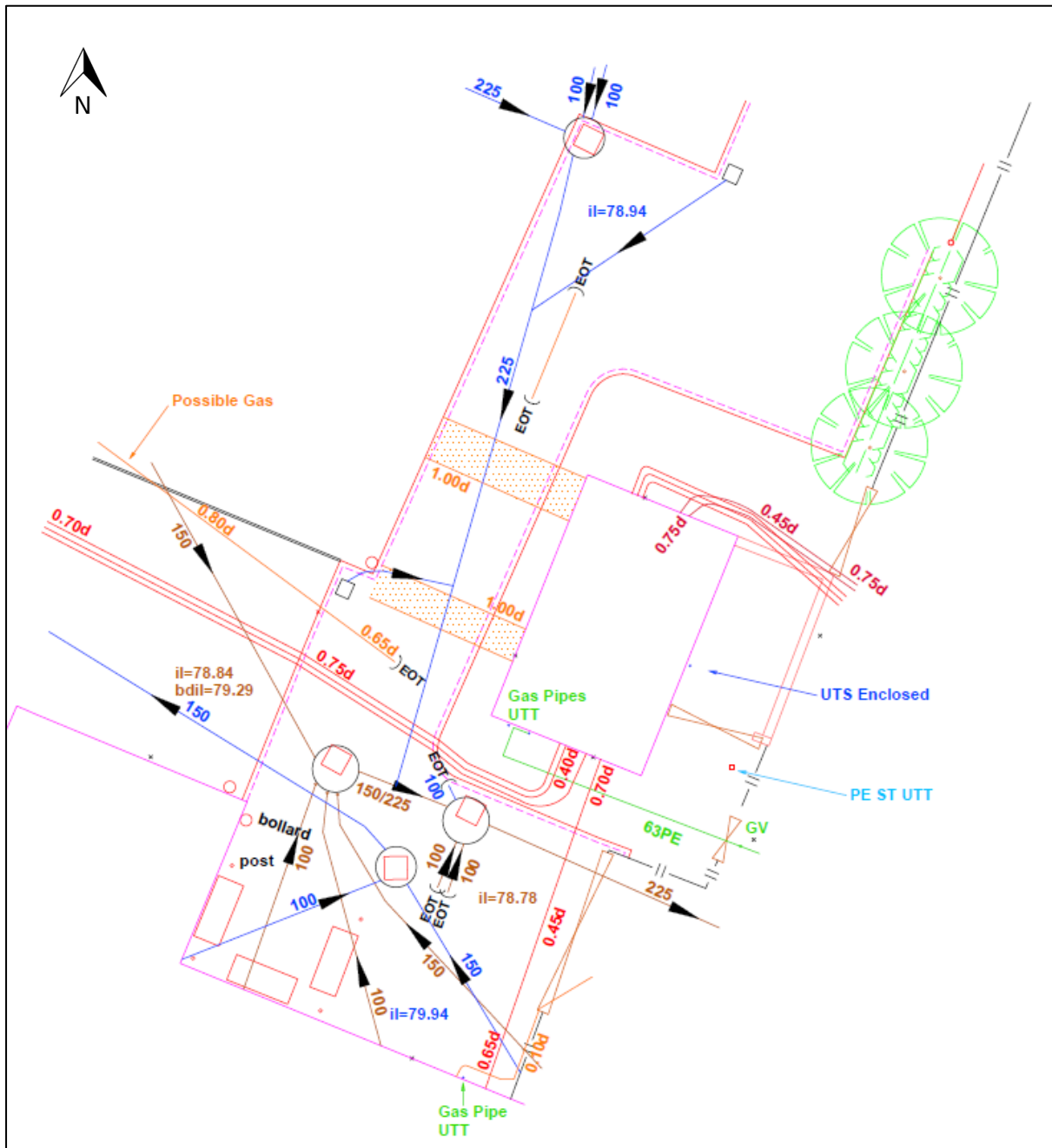
Figure 3 Site Photograph



Site Utility Services

- 2.6 A site utility survey has been conducted in addition to this desk study. An extract of this survey has been included overleaf as Figure 4.

Figure 4 Utility Survey Extract



3.0 ENVIRONMENTAL SETTING

- 3.1 The geology of the site is covered by British Geological Survey (BGS) online data and the site specific GroundSure Enviro+Geo Insight report (Appendix 1).
- 3.2 Environmental conditions are covered by Environment Agency (EA) and British Geological Survey (BGS) online data, and the site specific GroundSure Enviro+Geo Insight report (Appendix 1).

Geology

- 3.3 The BGS states that the site is not underlain by artificial deposits.
- 3.4 The site is underlain by superficial deposits of Devensian Till, comprising diamicton
- 3.5 The solid geology beneath the site is shown to straddle the Chester Formation, comprising sandstone and the Manchester Marls Formation, comprising mudstone.
- 3.6 There are 3 records of linear features within 500m of the site boundary. The closest record refers to a fault located 9m to the southwest of the site.
- 3.7 There are no records of landslips within 500m of the site boundary.
- 3.8 There are 16 borehole records identified within 250m of the site. The closest record is located 24m to the south of the site (BGS Reference: SD80SE899), drilled in 1972 by a cable percussive rig and is summarised below:
- Cobblestone to 0.14m.
 - Compact ash, cinder, small stone and brick rubble (fill) to 0.46m.
 - Firm yellow brown and grey streaked slightly sandy clay to 1.25m.
 - Compact mid-brown moist clayey and silty sand with some small gravel to 2.65m.
 - Soft to firm mid to dark brown silty clay to 3.05m.
 - Firm dark brown silty clay to 3.80m.
 - Firm to stiff mid brown silty clay with occasional small stones to 5.00m.
 - Compact mid to dark brown stratified clean to silty medium grain sand with traces of silt to 8.75m.
 - Compact mid-brown to dark brown saturated sandy silt with thin bands of silty clay and thin bands of wet medium grained silty sand to 10.00m.
- 3.9 The site is in an area where the hazard rating is negligible with regard to compressible deposits and soluble rocks. The hazard rating is very low with regard to shrink swell clays, running sands, collapsible deposits and landslides.

Ground Workings

- 3.10 There are 13 records of historical surface ground working features identified within 250m of the site boundary. The closest record refers to unspecified ground workings located 112m to the northwest of the site, dated 1906. Other records in the vicinity refer to ponds, unspecified ground workings, unspecified pits, unspecified heaps, cesspools, and refuse heap.

- 3.11 According to the BGS, there are no records of a British Pit within 500m of the site.

Mining and Other Underground Workings

- 3.12 The site is located within a coal mining reporting area and surface coal resource area. Reference to the Coal Authority Interactive viewer shows the site is not located within a Development High Risk Area.
- 3.13 There are no records for non-coal mining areas located within 1km of the site.
- 3.14 There are no areas of brine extraction, gypsum extraction, tin mining, or clay mining within 1km of the site.
- 3.15 There are no records for non-coal cavities or natural cavities identified within 1km of the site.
- 3.16 There are no records for historical underground working features identified within 1km of the site.

Radon Potential

- 3.17 The property is not located in a Radon Affected Area, with less than 1% of properties effected. Therefore, no radon protection measures are necessary.

Hydrogeology and Hydrology

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

Secondary Undifferentiated Aquifer '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.'

- 3.19 The Manchester Marls Formation is classified by the Environment Agency (EA) as a Secondary B Aquifer with a mixed flow type and a high permeability. The Chester Formation is classified as a Principal Aquifer with a fracture flow type and a low permeability. The BGS states the following:

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

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

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

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

- 3.21 There are 8 ground water abstraction licence records within 2km of the site. The closest record refers to a historical ground water source at Blackley, Manchester 1.38km northwest of the site.
- 3.22 There are no surface water abstraction licence records within 2km of the site.
- 3.23 There are no potable water abstraction licence records within 2km of the site.
- 3.24 The site is not located within 500m of a Source Protection Zone or Source Protection Zone within a confined aquifer.
- 3.25 There are no water network entries within 250m of the site.
- 3.26 There are no surface water features identified within 250m of the site.
- 3.27 There is 1 record of a Water Framework Directive (WDF) surface water body catchment located on site. The record refers to the Irk (Wince to Irwell) River WB catchment. The water body was a good chemical rating and moderate ecological rating in 2016.
- 3.28 There is 1 record of a Water Framework Directive (WDF) groundwater body located on-site. The record refers to Manchester and East Cheshire Permo-Triassic Sandstone Aquifer, which was a poor chemical rating in 2015.

Landfill & Waste Management Activity

- 3.29 There are no records of potentially infilled land from historical mapping records within 500m of the study site.
- 3.30 There are no records for current Environment Agency/Natural Resource Wales landfill records within 500m of the site.
- 3.31 There are 2 records of historic Environment Agency/Natural Resource Wales landfill sites within 500m of the site. The closest record refers to a historical landfill site with an unspecified waste type located 42m northwest of the site.
- 3.32 There are no records of BGS/DoE non-operational landfill sites within 500m of the study site.
- 3.33 There are no records of a historical waste site from the Local Authority and Historical Mapping Records within 500m of the site.
- 3.34 There are 7 records of a waste treatment, transfer or disposal site within 500m of the study site. The closest record refers to a treating waste exemption site located 175m to the west of the site. The site is described as repair and refurbishment of WEEE.
- 3.35 There are 5 records of current Environment Agency/Natural Resources Wales licensed waste sites within 500m of the site. The closest record refers to a Refuse Destructor located 340m to the northwest of the site, dated 1938.

Industrial Land Use Information

- 3.36 There are 67 records of potentially contaminative historical land uses identified within 500m of the site, the closest record being for a police station located 40m south of the site dated 1915-1923. Other records in the vicinity refer to unspecified ground workings, rope works, unspecified depots, corporation yards, unspecified stores, unspecified pits, unspecified heaps, a police station, unspecified mill, refuse heap, cesspools, unspecified ground workings and refuse destructor, etc.
- 3.37 There are 14 records of current potentially contaminative land uses identified within 250m of the site. The closest record refers to an electricity substation located 13m to the west of the site. Other records in the vicinity refer to a chimney, petrol station, electricity sub stations, telecommunications mast, disability and mobility equipment store, workwear store, curtains and blinds store, and council depot.
- 3.38 There are 4 records of historical tanks identified within 500m of the site. The closest record refers to two tanks located 77m to the northeast of the site, dated 1950-1971.
- 3.39 There are 34 records of historical energy features identified within 500m of the site. The closest record refers to six electricity substations, all located 113m to the southwest of the site, dated 1949-1988.
- 3.40 There is 1 record for current petrol or fuel sites within 500m of the site. The record refers to a garage located 41m to the southwest of the site with an open status.
- 3.41 There are no records of historical petrol or fuel sites within 500m of the site.
- 3.42 There are 5 historical garage and motor vehicle repair site records identified within 500m of the site. The closest record refers to a garage located 116m to the north of the site, dated 1979.
- 3.43 There are no National Grid high voltage underground electricity transmission cables within 500m of the site.
- 3.44 There are no National Grid high-pressure gas transmission pipelines within 500m of the site.
- 3.45 There is 1 historical railway and tunnel feature identified within 250m of the site. The closest record refers to tramway sidings located 69m to the northwest of the site, dated 1893.
- 3.46 There are no historical railway lines identified within 250m of the site.
- 3.47 There are no current active railway line records identified within 250m of the site.
- 3.48 There are no underground railway lines or tunnels identified within 250m of the site.
- 3.49 The site is not within 5km of the route of the High Speed 2 rail project.
- 3.50 The site is not within 500m of the route of the Crossrail 1 or Crossrail 2 project.

Environmental Permits, Incidents and Registers

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

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

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

- 3.52 There are 2 records of Part (2) and Part B Activities and Enforcements within 500m of the study site. The closest record refers to a current Part B Permit for the unloading of petrol at ASDA Harpurhey located 57m to the south of the site.
- 3.53 There is 1 record of Substantiated Pollution Incidents (Category 1 and 2) within 500m of the site. The closest record refers to landfill leachate released 494m to the west of the site. The pollutant was a category 3 (minor) impact on land and a category 4 in air (no impact).

Environmentally Sensitive Sites

- 3.54 There are 2 records of Ancient Woodland within 2km of the study site. The closest record is located 436m to the northeast of the site.
- 3.55 There is 1 record of Local Nature Reserves (LNR) within 2km of the study site. The closest record refers to Boggart Hole Clough located 271m to the north of the site.
- 3.56 There are 3 records of Nitrate Vulnerable Zones (NVZ) within 2km of the study site. The closest record refers to the existing River Irk NVZ located on site. However due to the proposed end use of the site not being of agricultural, this need not be considered.
- 3.57 There are no other records of Environmentally Sensitive Sites within 2km of the study site.

Ecology

- 3.58 An ecological assessment of the site falls outside the brief of this report. Where considered necessary, advice should be sought from an ecological specialist in this respect.
- 3.59 However, the site is classified as urban land.

Archaeology

- 3.60 An archaeological assessment falls outside the brief of this report. Where considered necessary, advice should be sought from an archaeological specialist in this respect.
- 3.61 However, there is 1 record of Listed Buildings within 250m of the site. The closest record refers to Harpurhey Baths and Laundry, Manchester which is a Grade II Listed Building located 55m to the north of the site.
- 3.62 There are no records of World Heritage Sites and Scheduled Ancient Monuments within 250m of the site.

Potential Flood Risks

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

Previous Site Investigations

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

4.0 SITE HISTORY

- 4.1 The historical development of the site has been determined by reference historical plans and Google Earth imagery. The reviewed historical plans comprise only readily available records and may be limited; however, the information available to date indicates that additional searches are unlikely to add to our understanding of the site. The earliest available historical mapping covering the site dates back to 1848.
- 4.2 The site history is summarised in Table 2, below, followed by selected extracts from maps and aerial photographs.

Table 2: Summary of Site History

Date	On-Site History	Surrounding Land Use History
1848 1:10,560	The site forms a small part of a field, adjacent to a large industrial building.	The site is located in a rural area but adjacent to a small residential area (Barnes Green). 2 main roads are located less than 50m to the south and the west of the site.
1891 1:10,560 1893 1:2,500 1906 1:10,560 1909 1:2,500	The site is located within a school building, directly adjacent to a road.	Residential housing surrounds the site starting 40m away in the west and the south and 20m to the east. A tramway is located 60m to the west of the site. Previously Rochdale Road. A rope works is located 200m to the east of the site. 2 areas of cesspools are located 250m to the west and northwest of the site. There is evidence of ground workings to accommodate these cesspools. The cesspools are gone by 1906.
1922 1:2,500 1923 1:10560 1932 1:2,500 1933 1:10,560 1938 1:10,560	Site still located within a school but Public Baths and Wash House now directly adjacent.	Reliance Works located 100m northeast of site (Soap and Oil) with tanks in the southern corner of the works. Corporation Yard located 250m west of the site
1949 – 1951 1:1,250 1950-1951 1:2,500 1952 1:1,250 (Partial) 1951-1955 1:2,500 (Partial) 1956 1:10560	No significant change.	No significant change.

Date	On-Site History	Surrounding Land Use History
1966-1968 1:10,560	No significant change.	No significant change.
1975-1977 1:10,000 1977-1980 1:1,250 1978 1:1,250 (Partial) 1980-1985 1:10,000 1982-1986 1:1,250	The previous buildings on site are no longer present. The site is labelled as being part of the Public Baths and Laundry.	No significant change.
1988 1:10,000 1988-1992 1:1,250 1993 1:1,250 Partial 1992-1995 1:1,250 Partial	The site appears to be part of an outdoor area for the Public Baths.	A shopping centre is present 60m south of the site.
Google Earth 2000	The site can be seen to be primarily a vacant grassed plot of land with the public baths crossing the north site boundary.	No significant change.
2001 1:10,000 2003 1:1,250	No significant change.	No significant change.
Google Earth 2003	No significant change.	No significant change.
Google Earth 2005	The site is now part of a larger construction site for the future Manchester College.	The immediate surrounding area is also a construction site.
Google Earth 2009	Construction has been completed with the site now comprising an asphalt road surface and a substation.	The immediate surrounding area is now a campus and buildings for The Manchester College.
2010 1:10,000	No significant change.	No significant change.
Google Earth 2013	No significant change.	No significant change.
Google Earth 2016, 2017, 2018, 2019	No significant change.	The building on the opposite side of Hemsley Street South has been demolished.

Figure 5 OS Map Extract 1848

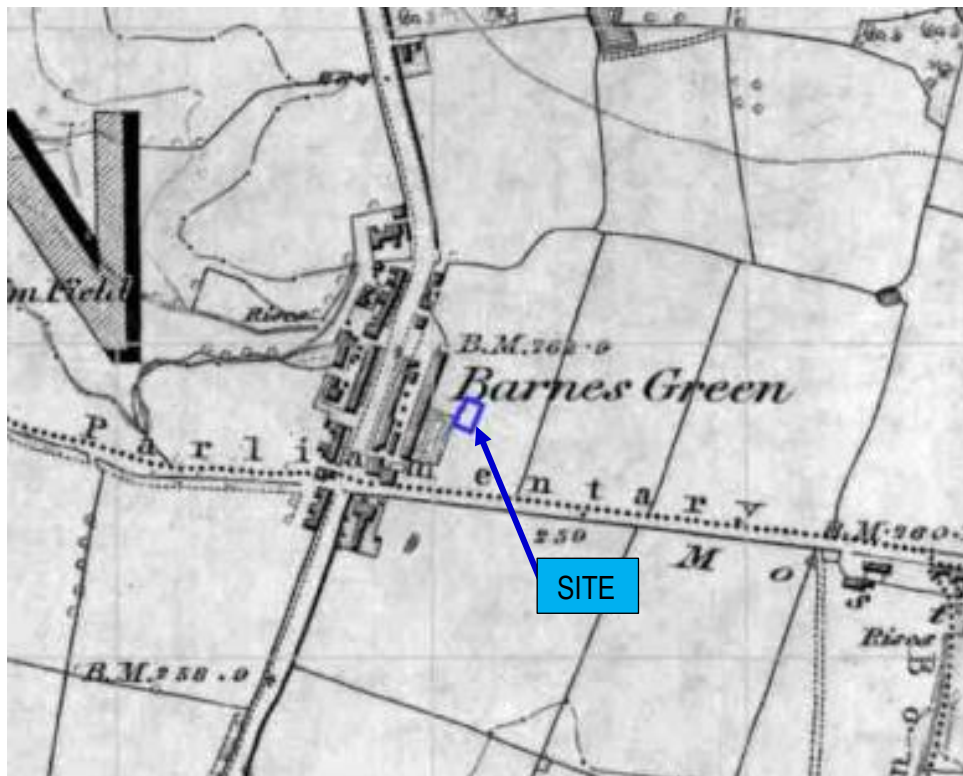


Figure 6 OS Map Extract 1932

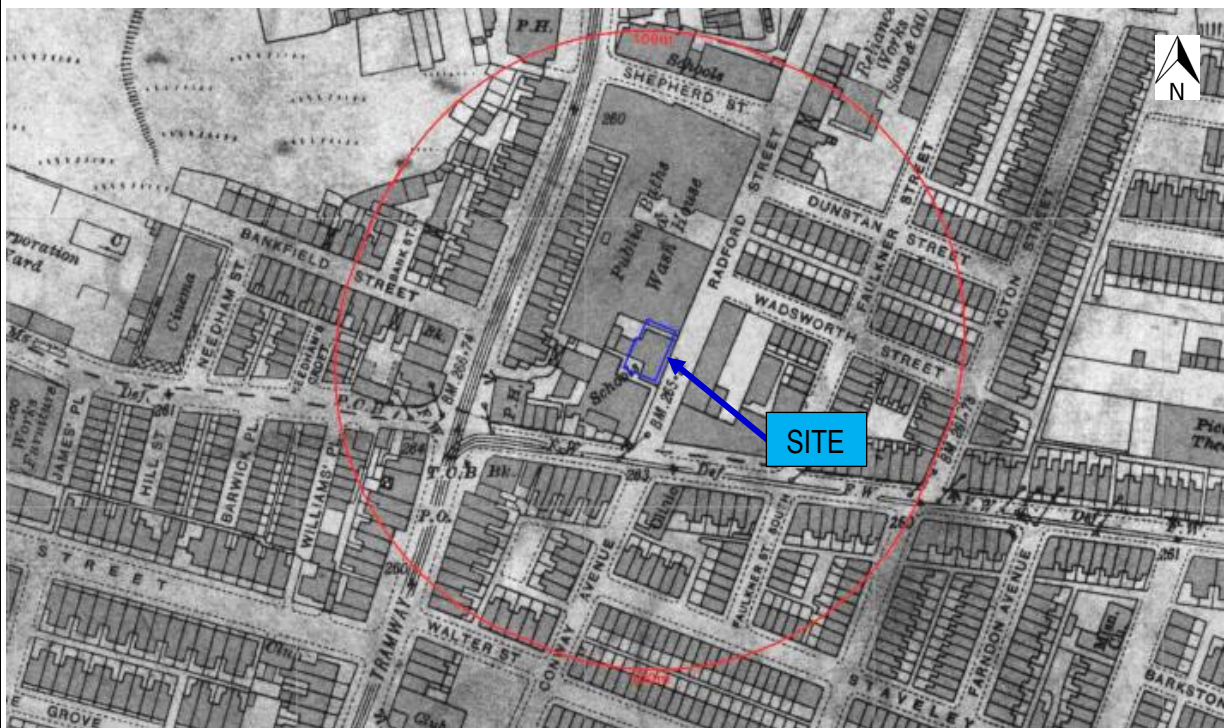


Figure 7 OS Map Extract 1988-1992

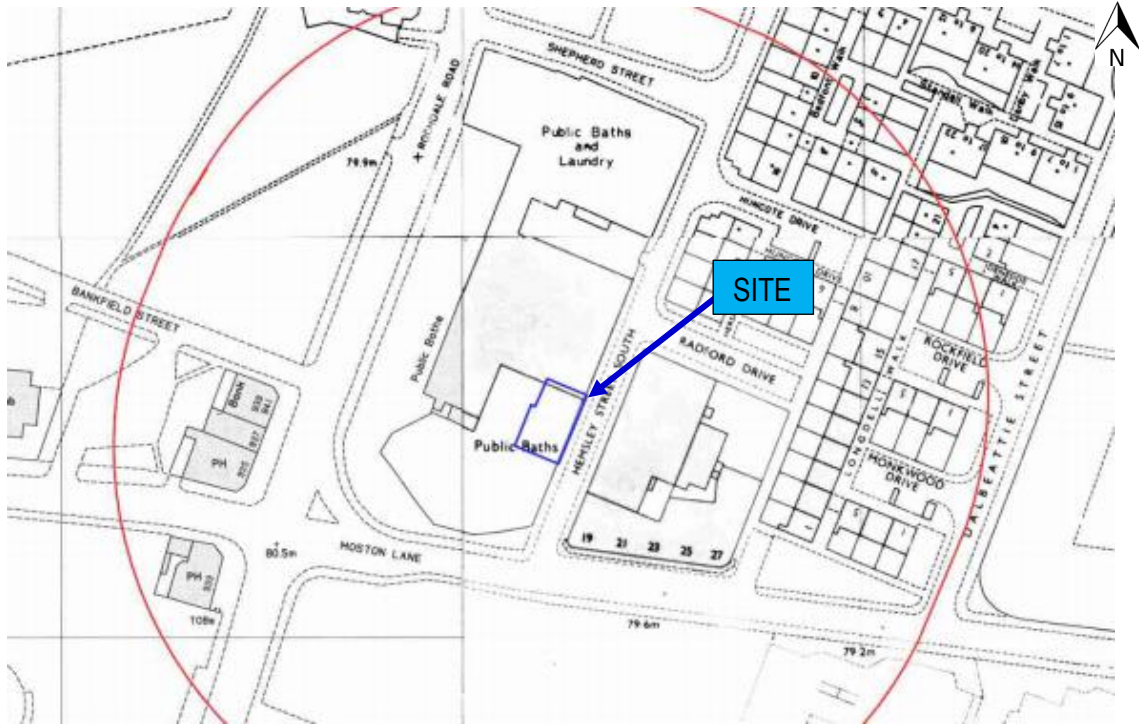


Figure 8 Aerial Photograph 2018



5.0 WALKOVER SURVEY

- 5.1 A walkover survey was completed on 22nd June 2020. The photographs and notes from this survey are appended to this report as Appendix 2 and Appendix 3 respectively.
- 5.2 The site is accessed via a metal gate on Hemsley Street South to the east of the site. The site currently comprises college grounds with an asphalt road surface. The site is surrounded by the college building and metal fencing with Hemsley Street South adjacent to the east.
- 5.3 In the centre of the site there is an electricity substation, property of Electricity North West.
- 5.4 There are three manhole covers located in the southern end of the site.
- 5.5 There is a water service point located on the eastern side of the site, sitting below the current cardboard refuse bin.
- 5.6 There is little change of topography on the site, only a slight slope from east to west.
- 5.7 Refuse storage lies on the eastern boundary between the substation and the pavement. This houses general waste and cardboard and has a concrete wall on its north and eastern boundaries.
- 5.8 There is a designated smoking area in the western corner of the site. This consists of litter bins and a shelter made with metal supports and corrugated plastic roof approximately 2.0-2.5 meters high.
- 5.9 There is a disabled access gate with intercom system in the southern corner of the site.
- 5.10 The site is bordered by the existing college buildings on the southern boundary, hard standing and more college buildings on the southern end of the western boundary, soft standing towards the northern end of the western boundary, hardstanding on the northern boundary and a metal fence with adjacent pavement/road on the eastern boundary.
- 5.11 The north, south and west boundaries of the site are made up of the college campus and buildings. To the east of Hemsley Street South is a public field with residential housing to the north east.
- 5.12 A site features plan is presented as Figure 9 overleaf.

Figure 9 Site Features Plan



6.0 PRELIMINARY CONTAMINATION RISK ASSESSMENT

Introduction

- 6.1 The following paragraphs outline a Preliminary Risk Assessment (PRA) for the site based on the above desk study information as defined by DEFRA and the EA Model Procedures for the Management of Land Contamination, CLR11⁽²⁰⁰⁴⁾.
- 6.2 Table 5 provides a Preliminary Conceptual Model (PCM) which considers the source-pathway-receptor linkages present alongside the likelihood, severity and risk level as defined within Table 3 and Table 4 below. The assessment of probability, a modified risk table, and certain consequence definitions are based on CIRIA C552 and CLR11.
- 6.3 Table 5 considers whether a pollution linkage is potentially present and provides a preliminary qualitative assessment of risk based on the information currently available. Where a possible linkage is identified, it does not necessarily mean that a significant risk exists but indicates that further information is required through appropriate site investigation to substantiate the conceptual model.
- 6.4 The PCM/PRA is based on a proposed commercial end use.

Table 3: Consequence, Probability and Risk

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

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

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

Potential Sources

- 6.5 Historically the site comprised rural land adjacent to an unknown industrial building. From 1893 the site consisted of a school building, until 1977 when it was then modified into a Public Baths and Wash House (and laundry) during its expansion (1977-1980). Most recently the site became part of the college campus of Manchester College with an electricity substation present within the college grounds.
- 6.6 Potential off-site sources of contamination include an infilled landfill 42 northwest of the site, a tramway located 60m west of the site, a reliance works located 100m to the northeast (soap and oil). Historical cesspools were located 200m west and northwest of the site, but these were removed by 1906.
- 6.7 There is potential for the presence of contamination associated with the following:
- Presence of an electricity substation on site.
 - Presence of a laundry within the Public Baths both on site and adjacent to site.
 - A filling station located 51m southwest of the site.
 - A historical landfill 42m northwest of the site with unspecified waste type.
 - Several unspecified pits and workings.
- 6.8 Contaminants may therefore include polychlorinated biphenyl (PCBs), volatile organic carbons (VOCs) and semi-volatile organic carbons (SVOCs), polycyclic aromatic hydrocarbons (PAHs) and total petroleum hydrocarbons (TPHs), asbestos and ground gas (methane and carbon dioxide).

Potential Receptors

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

Potential Pathways

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

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

Table 5: Preliminary Conceptual Model

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
Potential soil contamination E.g. Heavy Metals, PAH, TPH, BTEX and ground gases.	Dermal contact, ingestion and inhalation of soils dust	Current Site Users	Unlikely	Moderate	Low	The site is currently used as part of the college campus and is entirely covered in hardstanding. The risk is therefore considered to be LOW .
		Adjacent land users	Unlikely	Moderate	Low	The adjacent land is occupied by the rest of the college buildings. Therefore, the risk is considered LOW .
		Future land users	Unlikely	Moderate	Low	The proposed end use of the site will be a cold store. The entirety of the site will be covered in hardstanding. Therefore, the risk to future site users via direct exposure is considered to be LOW .
		Construction Workers	Low Likelihood	Moderate	Moderate to Low	Construction workers may be exposed to potentially contaminated soils during construction works, however exposure duration will be short-term only. The risk to construction workers is considered MODERATE to LOW . Appropriate health and safety measures (in line with CDM and other relevant health and safety guidance) will reduce the risk to LOW .
	Downward vertical migration of leachate to shallow groundwater	Groundwater within the Underlying Aquifer	Low Likelihood	Moderate	Moderate to Low	The site is underlain by a Secondary B aquifer and potentially a Principal Aquifer. There are no nearby water extraction licenses. The risk to groundwater is therefore considered MODERATE to LOW .
	Lateral migration in surface waters	Surface water	Unlikely	Moderate	Low	There are no nearby surface water sources. Therefore, the perceived risk to surface waters is considered to be LOW .
	Vertical or lateral migration of ground gas	Current Site Users	Unlikely	Moderate	Low	The site is currently used as part of the college campus and is almost entirely open to the atmosphere. There is an infilled landfill 42m northwest. The risk to current site users from ground gas is therefore considered LOW .
		Adjacent land users	Unlikely	Moderate	Low	The risk to adjacent site users from ground gas is considered LOW .
		Future land users	Low Likelihood	Moderate	Moderate to Low	The proposed end use of the site will be a cold store. The site will be entirely covered in hardstanding. There is an infilled landfill 42m northwest of the site. Therefore, the risk if considered MODERATE to LOW .

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
		Construction Workers	Low Likelihood	Moderate	Moderate to Low	Construction workers may be exposed to ground gas/depleted oxygen conditions in confined spaces and excavations, however, the duration will be short term. The risk to construction workers from ground gas is considered MODERATE to LOW
Asbestos Containing Material (ACM)		Current Site Users	Unlikely	Moderate	Low	The site is currently used as part of the college campus. The site is entirely covered in hardstanding. Asbestos may be present in small areas of the site associated with former structures. Asbestos is only harmful when disturbed. The risk to current site users is considered to be LOW .
		Adjacent land users	Unlikely	Moderate	Low	The adjacent land is occupied by college buildings and campus. Asbestos may be present in small areas of the site associated with former structures. Disturbance of soil during the construction phase may allow fibres to become airborne. Dust control measures (dampening down) should be implemented as part of good site working practices. Therefore, the risk is considered LOW .
		Future land users	Unlikely	Moderate	Low	The proposed end use of the site will be a cold store. The site will be entirely covered in hardstanding. The risk is therefore considered LOW .
		Construction Workers	Low Likelihood	Moderate	Moderate to Low	Construction workers may be exposed to potential asbestos in Made Ground soils associated with former structures. The risk is considered MODERATE to LOW .

7.0 CONCLUSIONS & RECOMMENDATIONS

Conclusions

- 7.1 The site historically comprised rural land adjacent to an unknown industrial building. From 1893, the site consisted of a school building until 1977 when it was modified into a Public Baths and Wash House (and laundry) during its expansion (1977-1980). Most recently the site became part of the college campus of Manchester College.
- 7.2 Potential on-site sources of contamination were identified to be polychlorinated biphenyl (PCBs), volatile organic carbons (VOCs) and semi-volatile organic carbons (SVOCs), polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPHs) asbestos and ground gas (methane and carbon dioxide). All from the presence of current or historical sources on site and adjacent.
- 7.3 The proposed development of the site is a Cold Store.
- 7.4 The site is underlain by Devensian Till, comprising Diamicton (Secondary Undifferentiated Aquifer) and the solid geology of the Manchester Marls (Secondary B Aquifer). The Chester Formation (Principal Aquifer) also crosses the future development site.
- 7.5 The property is not located in a Radon Affected Area.
- 7.6 Given the potential contaminative land uses, the overall risk from soil contamination to end users and construction workers is concluded to be **MODERATE** to **LOW**.
- 7.7 The risk to controlled waters is concluded to be **MODERATE** to **LOW** based on the potential for a Principal Aquifer within the Chester Formation.
- 7.8 The risk from ground gas to end users and construction workers is considered to be **MODERATE** to **LOW**.
- 7.9 The site is not located within a Zone 2 or Zone 3 floodplain and the risk of groundwater flooding is **LOW**.

Recommendations

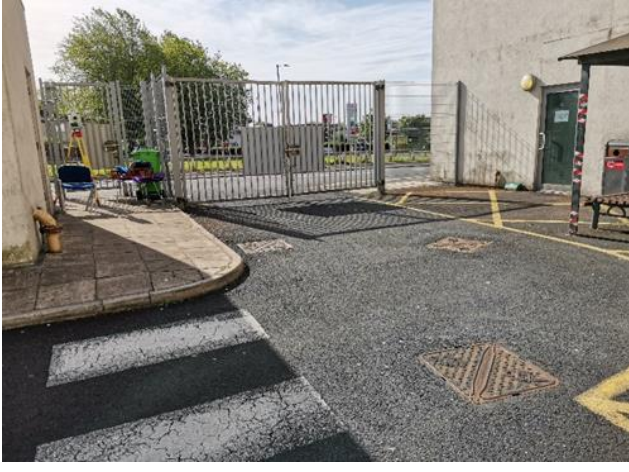
- 7.10 An intrusive investigation should be undertaken to establish geotechnical parameters for the design of foundations and floor slabs for the proposed new structure and surrounding area.
- 7.11 As part of the geotechnical investigation, it is recommended that samples of soil are recovered for contamination testing and to confirm whether there are any potential risks.

APPENDIX 1

GROUNDSURE REPORTS

APPENDIX 2

SITE PHOTOGRAPHS

Earth Environmental & Geotechnical Ltd Tel: 0161 975 6088 Email: info@earthenvironmental.co.uk Web: www.earthenvironmental.co.uk	SITE PHOTOGRAPHS 
Job No.: A3545/20	Site: Manchester College Harpurhey
Plate 1 Viewing south from access gate showing substation and northern boundary of the site.	Plate 2 View showing the electricity substation and ventilation from the building, smoking area and the north western boundary of the site (partly soft standing). Viewing south.
	
Date: 22nd June 2020	Date: 22nd June 2020
Plate 3 View of the southern side of the site including disabled access to the college campus and manhole covers. Note pipes coming out of both buildings. Viewing east.	Plate 4 Viewing northeast showing disabled access gate, access to substation and access to refuse store.
	
Date: 22nd June 2020	Date: 22nd June 2020

Earth Environmental & Geotechnical Ltd Tel: 0161 975 6088 Email: info@earthenvironmental.co.uk Web: www.earthenvironmental.co.uk	SITE PHOTOGRAPHS 
Job No.: A3545/20	Site: Manchester College, Harpurhey
Plate 5 Viewing northeast showing refuse storage including general waste and cardboard. Drainage pipe on east wall of substation with redundant extinguisher and pest control box adjacent.	Plate 6 View of the western boundary with college building and hard standing adjacent. Soakaway present.
	
Date: 22nd June 2020	Date: 22nd June 2020
Plate 7 Showing smoking area and shelter in west corner of the site. Shelter 2-2.5m in height with corrugated plastic roof and metal supports.	Plate 8 Viewing north, showing electricity substation and college campus in the background. Water feature lies adjacent to site and large chimney is a listed building from old public baths.
	
Date: 22nd June 2020	Date: 22nd June 2020

Figure 9 Site Walkover Photo Locations



APPENDIX 3

SITE WALKOVER NOTES

WALK OVER SURVEY REPORT

Site: Manchester College, Harpurhey

Date: 22nd June 2020

Job No: A3545/20

Undertaken By: Amy Ellams

Purpose of Site Walkover:

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

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Site Setting	Description required for: Town/Country/Suburb Setting Industrial/Residential/Retail Usage Current Site use (if undertaking security and access to the site)		Town setting. Surrounding areas are a mixture of residential and commercial usage. The site currently consists of college grounds with a smoking area, access routes and refuse store
Evidence of Past Activities	Are there: Any relevant street names in area? Features or relics which indicate past history?	~~Yes~~ /No Yes/ ~~No~~	A large chimney lies north of the site which is possibly a remnant of the old public baths and laundry/wash house.
Geographic Setting	Description required for: Low lying flood plain/dry valley/rolling hills etc.		The site is primarily flat slightly sloping from east to west.
Ground Conditions	Is there any evidence of: Mining, Mine entries Subsidence Landslip/slope erosion Former investigation works	~~Yes~~ /No ~~Yes~~ /No ~~Yes~~ /No	N/A N/A N/A

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Topography	Description required for: Are there apparent differences between site and surrounding area? (If yes describe the presence of retaining walls, and slopes). Is there evidence of Made Ground / Fill on site?	Yes/No Yes/No	N/A Yes, the site is entirely covered in hardstanding.
Site Boundaries and Neighbours	Description required for: Type of boundary demarcation (if any) on each side of site, usage of adjacent land and name of industrial/commercial occupiers. Note any adjacent features such as water course and other potentially environmentally sensitive uses (residential, school, infirmary, SSSI etc)		The site is bordered by existing college buildings on the southern boundary, hard standing and more college building on the southern end of the western boundary, soft standing towards the northern end of the western boundary, hardstanding on the northern boundary and a metal fence with adjacent pavement/road on the eastern boundary. Residential buildings lie the north east of the site and commercial buildings to the south. N/A
Vegetation	Are there any vegetation/trees on or close to site (if yes describe locations, type, maturity, etc) Is there any evidence of poor health / distress?	Yes/No Yes/No	There is grass located north of the site (adjacent). There are also several, singular trees (decoration) located north of the site. N/A
Ground Surface	Are there areas of hardstanding and estimate the split between hard and soft cover? (If yes describe locations, types and conditions). Is there any evidence of any spillages or staining?	Yes/No Yes/No	100% hardstanding None visible on the site walkover.

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Site Drainage	Are there any drain covers / soakaways (if yes describe locations)	Yes/No	There is a singular soakaway located in the centre of the western boundary.
	Are there any outfalls/water courses on site (note the condition of water courses in open water courses. discolouration, odour, eutrophication, oily sheen, gas bubbling water, clear or cloudy)	Yes/No	There is an open water feature located to the north west of the site.
	Where a watercourse runs alongside or crosses a site are there any differences in visible water quality upstream and downstream of the site?	Yes/No	None visible on the site walkover.
Electrical Equipment	Are there any electricity sub stations on or adjacent to the site? Are there any electrical transformers, capacitors, pylons etc on site?	Yes/No	There is an electricity substation located in the middle of the site.
Buildings	Is there any evidence of asbestos construction materials e.g. roofing, insulation materials.	Yes/No	None visible on the site walkover.
	Do any buildings have basements?	Yes/No	None seen on walkover or on development plans.
	Do any buildings have a boiler room (if yes, describe fuel type and storage arrangements)?	Yes/No	None recorded.

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Landfilling	Is there any evidence of gas protection measures (gas membrane, gravel-filled trenches, venting pipes, etc)?	Yes/No	N/A
Process Air Emissions	Point Source: Are there any stacks / vents / cooling towers / abatement equipment? Fugitive Source: is there any stockpiled material / windblown dust / vapour process?	Yes/No Yes/No	N/A N/A
Storage of fuels & Chemicals	Are there any drums / containers (if yes, describe quantity, full /empty, stored on hard standing / soft landscaping, bunding)? Are there any above ground fuel tanks (if yes, describe locations, volumes, how many, bunding, used / disused, condition?) Is there any evidence of underground fuel tanks (fuel pumps, covers, vent pipes, how many and how large, fill point, used / disused, and condition)?	Yes/No Yes/No Yes/No	A small redundant extinguisher was located next to the refuse storage in the eastern part of the site. Located on hardstanding. N/A N/A
Accidents	In the event of a large spillage would runoff affect any vulnerable watercourse/culverts? Are emergency procedures / equipment in place?	Yes/No Yes/No	Soakaway on site. Emergency equipment will be available within college buildings adjacent.

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Waste	Are there any waste skips present on site? Are waste storage facilities adequate? Is there any litter/fly tipped material?	Yes/No Yes/No Yes/No	General waste and cardboard recycling bins located in eastern part of the site. 2 litter bins located next to the smoking area in the southwestern corner also present. N/A
Atmospheric	Are there any fumes, odours originating from site or affecting site from neighbouring sites?	Yes/No	N/A
Access / Further Investigations	If a Phase 2 Investigation is likely to be required, describe any access problems including headroom where relevant, services, overhead cables, restricted access areas, confined spaces, trafficked areas, etc that are likely to affect investigation scope/techniques. Identify possible site office and storage locations. Identify possible water supply		Site includes a shelter over the smoking area which lies on top of proposed cold store. Access with a rig maybe limiting dependant on size of the rig. The plastic roof may be removable if required. Services most likely present and in quantity. Refuse store also restricts rig access as very tight space. (No CP or TP) Locked gates present however one has intercom. Site office likely to be inside the college buildings. Water supply within college building also.
Site Environs	Are there any local features that could have a harmful influence e.g. landfill, industrial processes, railway land? Are there any sensitive water features/courses near to the site?	Yes/No Yes/No	None adjacent to the site boundary. Water feature lies to the north west of the site but not considered sensitive.
Local Knowledge / Anecdotal Evidence			N/A
Site Dimensions	Describe shape of Site in plan and measure dimensions.		The maximum dimensions of the proposed site are 18m northeast to southwest and 12m west to east. The site occupies an area of approximately 0.02Ha.

APPENDIX 4

REPORT LIMITATIONS

LIMITATIONS

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

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

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

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

The report was written in 2020 and should be read in light of any subsequent changes in legislation, statutory requirements and industry best practices. Ground conditions can also change over time and further investigations or assessment should be made if there is any significant delay in acting on the findings of this report. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of Earth Environmental & Geotechnical Ltd. In the absence of such written advice of Earth Environmental & Geotechnical Ltd, reliance on the report in the future shall be at the client's own and sole risk. Should Earth Environmental & Geotechnical Ltd be requested to review the report in the future, Earth Environmental & Geotechnical Ltd shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between Earth Environmental & Geotechnical Ltd and the client.

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

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

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

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

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

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

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