







EARTH ENVIRONMENTAL
& GEOTECHNICAL

Phase I Geo-Environmental Desk Study

Victoria Avenue

Moston

March 2020

On behalf of

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EARTH ENVIRONMENTAL & GEOTECHNICAL

VICTORIA AVENUE

MOSTON

PHASE I GEOENVIRONMENTAL DESK STUDY

FOR

ALDI STORES UK

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Report No. A3469-20 **MARCH 2020**

Report Title:	**Victoria Avenue, Moston** **Phase I GeoEnvironmental Desk Study**
Report Reference:	**A3469-20**
Client:	**ALDI Stores UK**
Issue Date:	**14th March 2020**
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EARTH ENVIRONMENTAL & GEOTECHNICAL

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1.0 INTRODUCTION

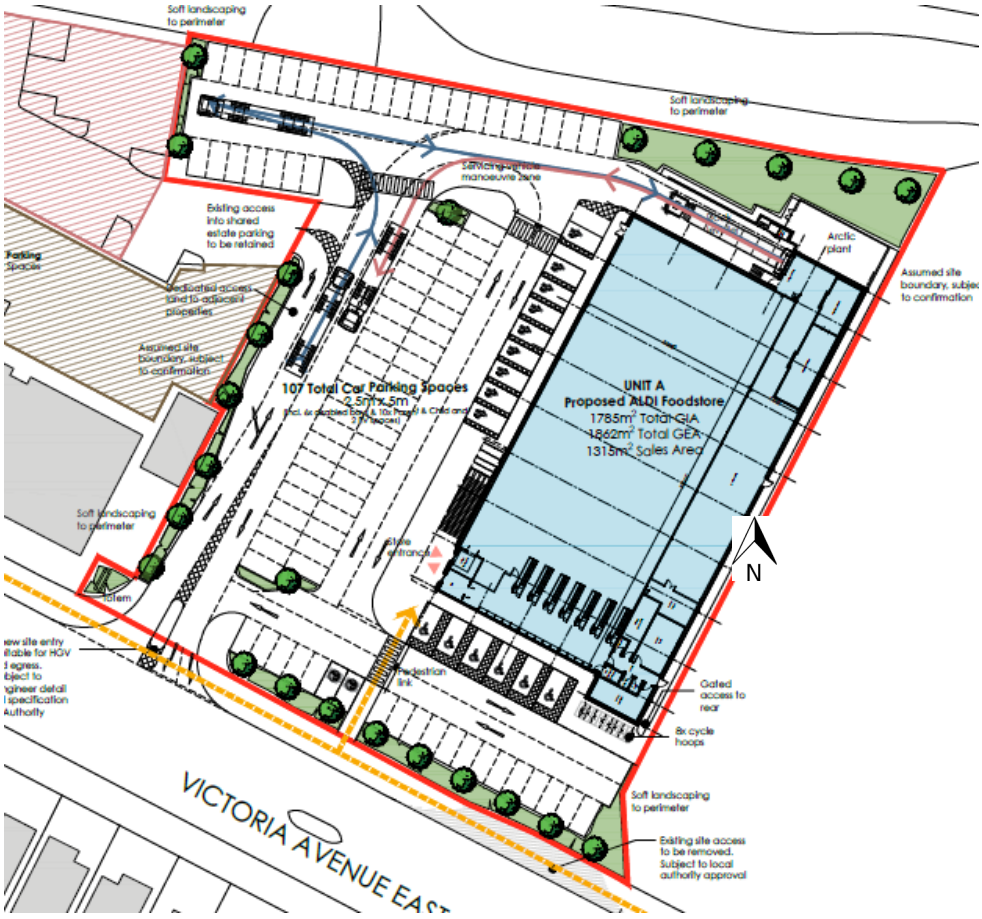
Appointment

1.1 Earth Environmental & Geotechnical Ltd have been commissioned by SWF Consulting, on behalf of ALDI Stores UK (the client), to undertake a Phase I Environmental Desk Study for the proposed development at Victoria Avenue, Moston.

1.2 It is understood that the Client intends to erect a foodstore with associated vehicle parking facilities. The store will cover a total area of 1862m^2 and there will be 107 parking spaces. Access will be provided via Victoria Avenue East.

1.3 A proposed development plan for the site is shown in Figure 1 below.

Figure 1 Proposed Development Plan



Objective

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

Phase 2 Ground Investigation.

Scope

1.5 The Phase I Environmental Desk Study comprises of a site reconnaissance visit and a review of the following information sources.

- 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 1.6km north of the centre of Moston. The approximate National Grid Reference for the centre of the site is SD 88213 03383 (X: 388213, Y: 403383) with the closest postcode being M9 7GH.

2.2 The site is an irregular shaped parcel of land with maximum dimensions of approximately 127m north east to south west and 124m north west to south east. The area of the site is 0.68ha with a flat and level topography.

2.3 Currently on site are 2no. restaurant style businesses in the south western section. There is an outdoor seating area associated with these businesses. The north eastern area is a large macadam car park. There is an oblong shaped area in the northern most part of the site covered with grass and trees. The boundaries to the north and east are made of metal fencing. The southern boundary is made up by the building. The western most boundary is partially open and partially made up of a restaurant building on site.

2.4 Immediately north of the site is a wooded area containing an unspecified concrete block housing manhole covers and vents. Beyond that is the M60. To the east is a sports field. South of the site is Victoria Avenue East. Directly west of the site is an apartment block, just north of which are the associated macadam parking facilities. Past that to the west is a gym with parking.

2.5 A location plan is shown below as Figure 2 together with a site photograph as Figure 3 (overleaf).

Figure 2 Site Location Plan



Figure 3 Site Photograph



Site Utility Services

2.6 Site service plans have not been obtained for the site on behalf of the client. The status of all services should be checked prior to any development (including site investigation) commencing.

3.0 ENVIRONMENTAL SETTING

3.1 The geology of the site is covered by British Geological Survey (BGS) online data and the site specific GroundSure GeoInsight 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 EnviroInsight report (Appendix 1).

Geology

3.3 The BGS states that the site is not underlain by artificial deposits. However, is should be noted made ground is found to be 3m north of the site.

3.4 The site is underlain by 2no. superficial deposits, Devensian Diamicton Till and Peat.

3.5 The solid geology beneath the site is shown to be the Pennine Middle Coal Measures Formation comprising mudstone, coal seams, siltstone and sandstone.

3.6 There are 18no. records of linear features within 500m of the site boundary. There are 2no. features located on site. The first is an inferred coal seam and the second is a buried channel or valley margin.

3.7 There are no records of landslips within 500m of the site boundary.

3.8 There are 43no. borehole records identified within 250m of the site. The closest record named Victoria Avenue East 6 located 14m to the south west of the site. It is confidential and therefore no information is available. The closest available record is M66 MHR OUTER R/RD BHF46 and is located 71m to the north of the site. It describes a 10.00m borehole encountering clay with strengths varying from soft to stiff, generally increasing with depth.

3.9 The site is in an area where the hazard rating is negligible for soluble rocks. It is very low with regard to running sands, collapsible deposits, landslides and shrink-swell clays. The risk with regard to compressible deposits is considered to be high, due to the presence of peat.

Ground Workings

3.10 There are 8no. records of historical surface ground working features identified within 250m of the site boundary. The closest record refers to an unspecified disused pit located 111m to the north of the site. Other records in the vicinity refer to further disused pits, ponds and unspecified ground workings.

Mining and Other Underground Workings

3.11 There is 1no. record of a historical mining area within 1km of the site boundary. This record refers to Greengate Brickworks located 244m to the north west of the site. It is a historical clay and shale surface mineral working.

3.12 Reference to the Coal Authority Interactive viewer shows the site to be located within a Development High Risk Area, associated with a coal seam outcropping on the site.

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 9no. records for historical underground working features identified within 1km of the site. The closest record refers to a Collieries in 1906 located 532m to the south of the site. Other records refer to further Collieries, unspecified old shafts and unspecified mines.

Radon Potential

3.17 The property is not located in a Radon Affected Area as less than 1% of properties are above the Action Level. Therefore, radon protection measures are not necessary.

Hydrogeology and Hydrology

3.18 The superficial deposits are classified by the Environment Agency (EA) as an unproductive Aquifer. The superficial deposits both have a mixed flow type and very low to high permeability. The BGS states the following:

> *'These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.'*

3.19 The Pennine Middle Coal Measures are classified by the Environment Agency (EA) as a Secondary A Aquifer with a fracture flow type and low to moderate permeability. The BGS states the following:

> *Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.'*

3.20 The groundwater vulnerability and soil leaching potential of the soils at the site has been classified as having low vulnerability and low leaching potential the BGS states:

> *'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 no groundwater abstraction licence records within 2km 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 500m of the site.

3.26 There are no surface water features identified within 250m of the site.

Landfill & Waste Management Activity

3.27 There is 1no. record for a current Environment Agency landfill record within 500m of the site. This record refers to a Co-Disposal Landfill site located 82m to the north of the site. No further details regarding waste type or dates of activity are provided.

3.28 There are 4no. records of historic Environment Agency landfill sites within 500m of the site. The closest record refers to Chadderton Landfill located 81m to the north of the site. The site received Inert, Industrial, Commercial, Household and Special waste beginning in 1948. The licence was surrendered in 1996.

3.29 There are no records of a BGS/DoE non-operational landfill sites within 500m of the study site.

3.30 There are no records of landfills from the Local Authority and Historical Mapping Records within 500m of the site.

3.31 There is 1no. record of waste treatment, transfer or disposal sites within 500m of the study site. The closest record refers to Higher Gibfield Farm located 371m to the south of the site. It is used for the storage of sludge.

3.32 There are 3no. records of Environment Agency/Natural Resources Wales licensed waste sites within 500m of the site. The closest record refers to Chadderton Landfill site located 333m to the north of the site. It is a Co-Disposal Landfill site.

Industrial Land Use Information

3.33 There are 29no. records of potentially contaminative historical land uses identified within 500m of the site. The closest record refers to an unspecified disused pit located 111m to the north of the site. Other records in the vicinity refer to unspecified depots, unspecified pits, railway sidings, unspecified mills, sponge cloth mills, unspecified disused pits, cotton waste mills, cloth mills, unspecified factories, unspecified ground workings, brick works, unspecified works, unspecified commercial/industrial, engineering works, cuttings and unspecified warehouses.

3.34 There are 6no. records of potentially contaminative current land uses identified within 500m of the site. The closest record refers to travelling cranes and gantries located 36m to the north of the site. Other records in the vicinity refer to further travelling cranes and gantries, electricity substations and vehicle repair, testing and servicing facilities.

3.35 There are 12no. records of historical tanks identified within 500m of the site. The closest record refers to tanks located 221m to the south of the site.

3.36 There are 7no. records of historical energy features identified within 500m of the site. The closest record refers to an electricity substation located 182m to the east of the site from 1980-1997.

3.37 There are no records for current petrol or fuel sites within 500m of the site.

3.38 There are no records of historical petrol or fuel sites within 500m of the site.

3.39 There are no historical garage and motor vehicle repair site records identified within 500m of the site.

3.40 There are no National Grid high voltage underground electricity transmission cables within 500m of the site.

3.41 There are no National Grid high-pressure gas transmission pipelines within 500m of the site.

3.42 There are 4no. historical railway and tunnel features identified within 250m of the site. The closest record refers to railway sidings located 137m to the north east of the site in 1966.

3.43 There are no historical railway lines identified within 250m of the site.

3.44 There are no current active railway lines identified within 250m of the site.

3.45 There are no underground railway lines or tunnels identified within 250m of the site.

3.46 The site is not within 5km of the route of the High Speed 2 rail project.

3.47 The site is not within 500m of the route of the Crossrail 1 rail project.

Environmental Permits, Incidents and Registers

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

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

Permit/Incident/Register	Number
Sites Determined as Contaminated Land under Part 2A EPA1990	0
Control of Major Accident Hazards (COMAH)	0
Regulated explosive sites	0
Hazardous substance storage/usage	0
Historical licensed industrial activities (IPC)	0
Licensed industrial activities (Part A (1))	0
Licensed pollutant release (Part A (2)/B)	0
Radioactive Substance Authorisations	0
Licensed Discharge Consents to controlled waters	0
Pollutant release to surface water (Red List)	0
Pollutant release to public sewer	0
List 1 Dangerous Substances	2
List 2 Dangerous Substances	0
Pollution Incidents (EA/NRW)	0
Pollution Inventory Substances	0
Pollution Inventory waste transfers	0

Permit/Incident/Register	Number
Pollution inventory radioactive waste	0

3.49 There are 2no. records for List 1 Dangerous Substances within 500m of the study site. The closest record refers to an active licence with regard to Cadmium at a site located 370m to the north of the site.

Environmentally Sensitive Sites

3.50 There are 3no. Sites of Special Scientific Interest (SSSI) within 2km of the study site. The closest is the Rochdale Canal located 1km to the north east of the site.

3.51 There are 3no. Special Areas of Conservation (SAC) within 2km of the study site. The closest is the Rochdale Canal located 1km to the north east of the site with regards to floating water-plantain.

3.52 There are no Special Protection Areas within 2km of the study site.

3.53 There are 2no. records of Ancient Woodland within 2km of the study site. The closest is Boggart Hole Clough located 827m to the south west of the site.

3.54 There are 2no. records of Local Nature Reserves (LNR) within 2km of the study site. The closest is Boggart Hole Clough located 1.1km to the south west of the site.

3.55 There site is located within a Nitrate Vulnerable Zone.

3.56 There are no records of National Parks (NP) within 250m of the study site.

3.57 There are no records of Greenbelt land within 2km of the study site.

3.58 There are no other records for Designated Environmentally Sensitive Sites within 2km of the study site.

Ecology

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

Archaeology

3.60 An archaeological assessment falls outside the brief of this report. Where considered necessary, advice should be sought from an archaeological specialist in this respect.

Potential Flood Risks

3.61 Detailed assessment of flood risks is outside the scope of this report.

3.62 However, the site does not lie within 50m of an Environment Agency Zone 2 or Zone 3 floodplain.

3.63 There are no records of flood defences, areas benefitting from flood defences or areas used for flood storage within 250m of the site.

3.64 According to the Environment Agency the highest risk of flooding on site is moderate.

Previous Site Investigations

3.65 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	There is a road running northwest to southeast across the centre of the site. The remainder of the site is made up of agricultural fields.	All of the areas directly surrounding the site are agricultural fields. There are residential properties 175m to the southwest 500m east of the site is a railway line running north south. There is an old coal pit 675m to the south of the site. 1km north west of the site is a sand and marl pit.
1891 1:10,560 1893 1:2,500	Along the northern boundary of the site is a pond.	There are many small ponds across the entire area. 350m south of the site are residential properties and places of worship. 600m to the southeast of the site are reservoirs. Sand and marl pit is no longer in use.
1906-1907 1:10,560 1909 1:2,500	The site remains unchanged.	350m south, 400m south east and 800m south east are increased residential properties. 350m south is a cotton waste mill.
1915-1916 1:10,560 1922 1:2,500 1923 1:10,560	The site remains unchanged.	Sponge Cloth Mill is 330m south. Moston mill is 650m south east. 700m south west are clay pits.
1932-1933 1:10,560 1932-1933 1:2,500	The site makes up part of a large sports field.	Immediately south of the site is Victoria Avenue, East. 50m south are residential properties. 150m south east is a sports pavilion surrounded by bowling greens, a putting green and tennis grounds. 200m east and south east are residential properties.

Date	On-Site History	Surrounding Land Use History
		400m south east is an engineering works. 400m south west is a high school. There are large residential estates 400m south and 750m south east of the site. There is a brick works 650m south west of the site. There are buildings 750m north east.
1938 1:10,560	The site remains unchanged.	There are residential properties 250m east, 550m east 700m south west.
1950-1951 1:1,250 1951 1:2,500 1952 1:1,250	The site has a track and a thin and of vegetation running along its most southern boundary, parallel to Victoria Avenue, East.	There are residential properties just beyond Victoria Avenue to the south of the site. There are residential properties 120m west. There is a clay pit 150m north east. There is a factory 250m north east.
1953-1958 1:1,250 1956 1:10,560	The site remains unchanged.	There are residential properties 130m to the south west. There is a brick works 400m north. 500m and 650m south west are schools. 500m west are more residential properties. 500m north west is a golf course. 650m south west are residential properties. The buildings 750m north are engineering works.
1966 1:10,560	The site remains unchanged.	There are residential properties 150m south west. 800m north east is a generating station
1967 1:1,250 1969 1:2,500	The site remains unchanged.	The residential properties 20m to the south west across Victoria Avenue are no longer present. There is a pond 150m north east.
1974-1975 1:1,250 1975 1:10,000 1975-1976 1:1,250 1980 1:10,000	The site remains unchanged.	All of the residential properties to the west of the site are no longer present. They are replaced by infrequent individual residential properties. There is a large residential building complex 50m south west of the site. There is a disused pit 90m north and 700m south west of the site. 100m south west of the site is a work centre.

Date	On-Site History	Surrounding Land Use History
1980-1985 1:1,250		120m north west is a depot. The tennis courts to the east are no longer present. 750m north west a factory and depot. 750m south east are residential properties. 750m south west is a clay pit.
1988 1:10,000 1990-1992 1:1,250 1992-1993 1:1,250	The site remains unchanged.	250m south west are residential properties. The works 450m north east is no longer present. There is a works 500m north. 550 north of the site is a warehouse. 600m east is an electricity substation. There are residential properties 750m north. The reservoirs to the south of the site are no longer present.
2001 1:10,000	There is a restaurant in the south part of the site.	The depot to the west of the site is no longer present. Greengate industrial park is 650m north of the site. 750m north east are industrial buildings.
2003 1:1,250	The site is laid out as it is presently. There is a car park in the northern section of the site and there is a separate soft cover area in the north west.	30m north is the M60. 30m south of the site are residential properties. 100m west is an electricity substation.
2010 1:10,000	The site remains unchanged.	20m south west are residential properties. 100m west is an unspecified building. 400m west is a playing field. 400m south west are residential properties. Factory 250m north east has reduced in size. 750m north east is an industrial building.
2020 1:10,000	There is a road running along the eastern edge of the site and cutting across to the western boundary.	There is an apartment building directly west of the site. There are green spaces directly north of the site running along the border of the M60, 300m west, 520m west, and 600m south of the site. There is an education facility 500m west. There are ponds 500m north west, 600m north west and 800m north west.

Date	On-Site History	Surrounding Land Use History
Google Earth Aerial Imagery 2000	The site has restaurant along its southern most border. North of this is a macadam car park. There is an area of soft cover in the north western corner of the site.	Directly north of the site is a thing parcel of land followed by the M60. At this time, it is under construction. East of the site is playing field. South of the site is Victoria Avenue East, beyond which are residential properties. West is a construction site beyond which is a gym. 60m north of the site are grassy fields. 110m north east is a large car park. 220m east are residential properties. 250m north east is a factory. 270m south west is a high-rise residential building. There are 2no. education facilities c. 490m south west. 540m east is a railway. 650m west are further high-rise residential properties.
Google Earth Aerial Imagery 2003	The site remains unchanged.	The construction site to the west of the site is now a completed car park.
Google Earth Aerial Imagery 2005	The site remains unchanged.	There is a construction site 260m south west.
Google Earth Aerial Imagery 2009-2019	The site remains unchanged.	There are apartment buildings directly west of the site. The construction site 260m south west is now a residential estate.

Figure 4 OS Map Extract 1848

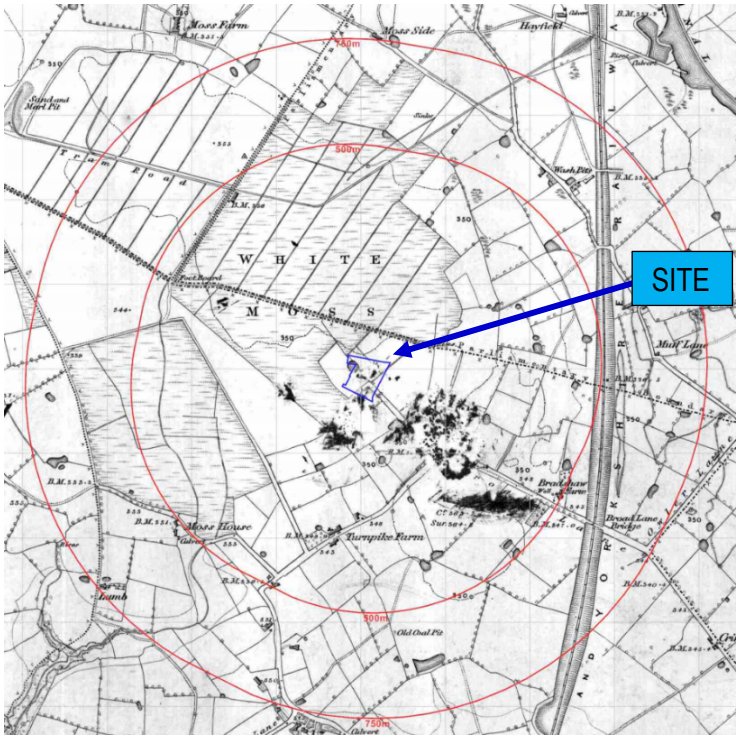


Figure 5 OS Map Extract 1932-1933

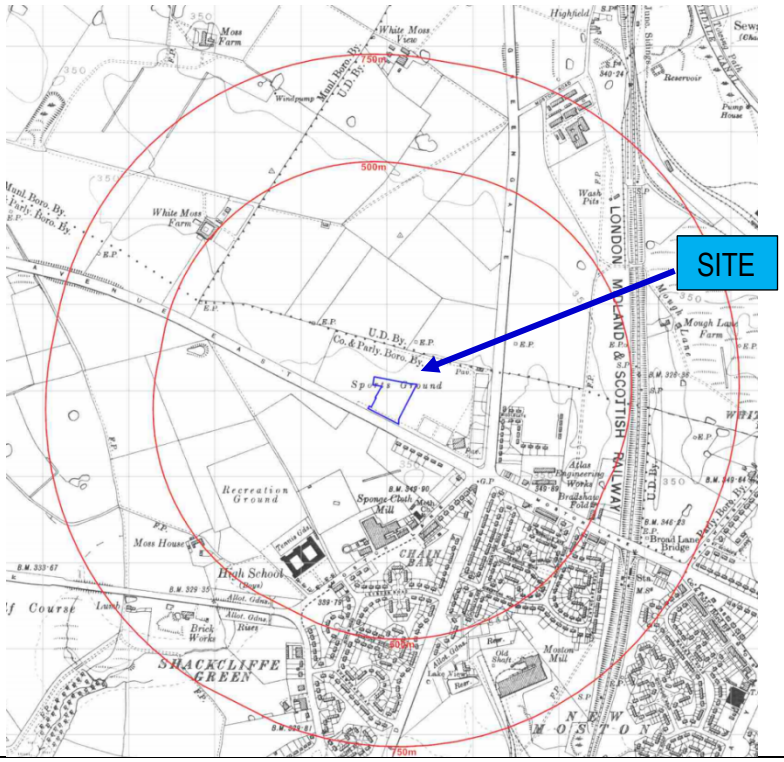


Figure 6 OS Map Extract 2001

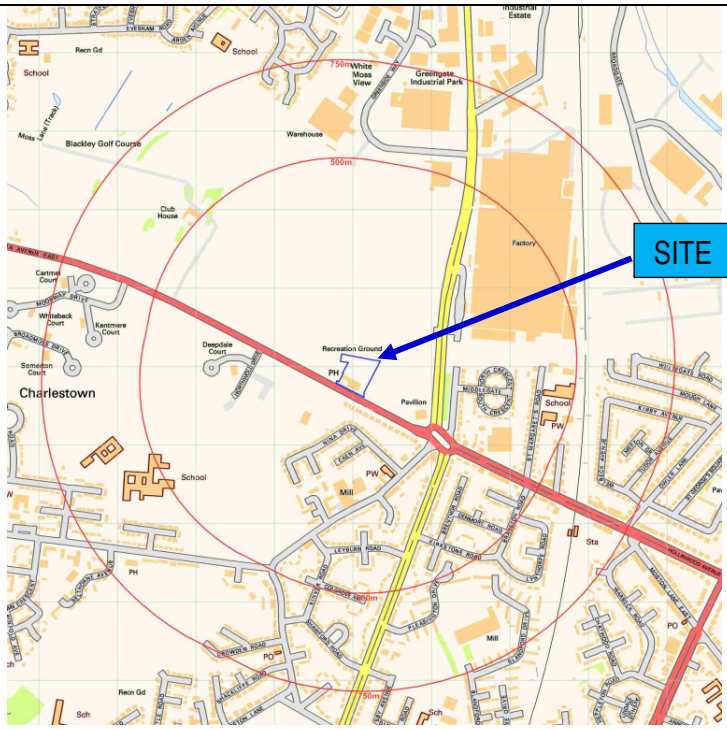


Figure 7 Google Earth Aerial Photograph 2017



5.0 SITE WALKOVER SURVEY

5.1 A walkover survey was completed on 12th March 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 Victoria Avenue East in the south east corner of the site. It currently comprises 2no. restaurants in the southern area of the site. The northern section is made up of a macadam car park. In the north western corner of the site is an area of soft cover with grass and trees.

5.3 The site is understood to be occupied and in use for its above described purposes.

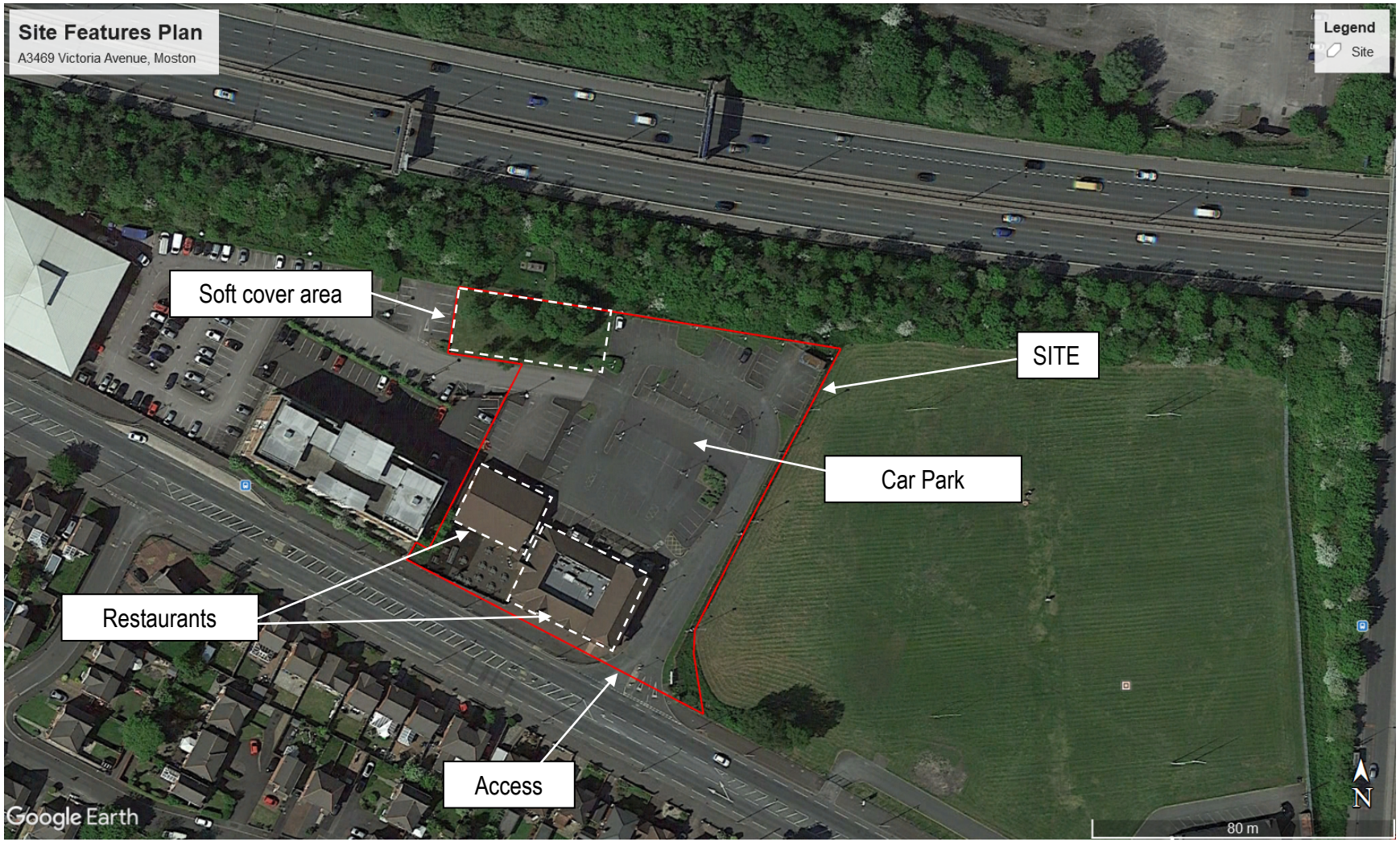
5.4 The site is generally by macadam with small areas of grassy cover around the northern and eastern boundary as well as the area in the north west corner.

5.5 The site is generally bordered by metal fencing to the north and east and partially to the west. The buildings on site make up the rest if the southern and western boundaries.

5.6 The immediate surrounding areas to the north is a heavily vegetated strip of land beyond which is the M60. The area to the east is a playing field. To the south and west are residential properties.

5.7 A site features plan is presented as Figure 8 overleaf.

Figure 8 Site Features Plan



6.0 PRELIMINARY CONTAMINATION RISK ASSESSMENT

Introduction

6.1 The following paragraphs outline a Preliminary Risk Assessment (PRA) for the site based on the above desk study information as defined by DEFRA and the EA Model Procedures for the Management of Land Contamination, CLR11(2004).

6.2 Table 5 provides a Preliminary Conceptual Model (PCM) which considers the source-pathway-receptor linkages present alongside the likelihood, severity and risk level as defined within Table 3 and Table 4 below. The assessment of probability, a modified risk table, and certain consequence definitions are based on CIRIA C552 and CLR11.

6.3 Table 5 considers whether a pollution linkage is potentially present and provides a preliminary qualitative assessment of risk based on the information currently available. Where a possible linkage is identified, it does not necessarily mean that a significant risk exists but indicates that further information is required through appropriate site investigation to substantiate the conceptual model.

6.4 The PCM/PRA is based on a continued 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 There was a road present on site in 1848. In 1932 the site became part of a large sports field. In 2001 restaurants were built on the south of the site. Following this in 2003 a car park was built to the north of the site. Beyond the northern boundary of the site is the M60. There are industrial buildings 216m north east, 216m south and 330m south east of the site. The remaining surrounding area is made up of residential properties.

6.6 There is potential for the presence of contamination associated with the following:

- Made Ground from various phases of on-site development, infilled features along the site boundary and land associated with the construction of the M60 just north of the site.
- Asbestos containing materials (ACM) from structures on site
- Ground gas associated with peat, nearby historical landfill, deep made ground and nearby infilled features.

Potential Receptors

6.7 The following receptors have been considered for the construction and operational stages of the proposed redevelopment.

- Current site users;
- Adjacent land users;
- Future land users;
- Construction workers during site development works;
- Groundwater within the underlying aquifer

Potential Pathways

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

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

Table 5: Preliminary Conceptual Model

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
Made Ground across site (Heavy Metals, PAH & TPH)	Dermal contact, ingestion and inhalation of soils dust	Current Site Users	Unlikely	Moderate	Low risk	The site is generally covered by hard standing macadam. There is therefore no potential for direct contact between contaminated soils and receptors. The only area of soft standing is in the north west corner of the site where there has been minimal development. The risk is therefore considered to be **LOW**.
		Adjacent land users	Low Likelihood	Moderate	Moderate to Low risk	Residential properties partially surround the site. The risk is considered **MODERATE to LOW** and usual dust control measures should be implemented as part of good site working practices during construction to reduce dust generation.
		Future land users	Unlikely	Moderate	Low risk	The proposed development will include a commercial food store with areas of soft cover. However, the majority of the site will be covered by hardstanding. The risk to future site users via direct exposure is considered to be **LOW.** This assessment is based on the sensitivity of the receptor and the potential for contamination to be present beneath the site.
		Construction Workers	Low Likelihood	Moderate	Moderate to Low risk	Construction workers are likely to be exposed to potentially contaminated Made Ground materials during construction works, however exposure duration will be short-term only. Assuming appropriate health and safety measures are adopted (in line with CDM and other relevant health and safety guidance) a **LOW** risk to construction workers is anticipated.
	Downward vertical migration of leachate to shallow groundwater	Groundwater within the Underlying Aquifer	Unlikely	Moderate	Low risk	Shallow groundwater is unlikely to be present beneath the site, there are no nearby abstraction licenses and the underlying superficial soils are anticipated to have generally low permeability. The risk to groundwater is therefore considered **LOW.**
	Vertical or lateral migration of ground gas	Current Site Users	Low Likelihood	Moderate	Moderate to Low risk	There is potential for Made Ground soils beneath the site from various stages of onsite development. However, the impermeable nature of the underlying superficial deposits would likely inhibit migration of any ground gases present. The risk to current site users from ground gas is therefore considered **LOW.**
		Adjacent land users	Unlikely	Moderate	Low risk	Considering the nature of the underlying superficial deposits there is low potential for ground gas migration. The risk to adjacent site users from ground gas is therefore considered **LOW.**

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
		Future land users	Low Likelihood	Moderate	Moderate to Low risk	There is potential for Made Ground from former structures and potentially organic soils beneath the site. However, given the nature of the underlying superficial deposits, they would likely inhibit migration of any ground gases present. Equally the majority of the site will be covered by hard standing therefore breaking the pollutant receptor linkage. The risk to future site users from ground gas is therefore considered **LOW.**
		Construction Workers	Low Likelihood	Moderate	Moderate to Low risk	Construction workers may be exposed to ground gas/depleted oxygen conditions in confined spaces and excavations; however, the duration will be short term. The risk to construction workers from ground gas is considered **MODERATE to LOW.**
Asbestos Containing Material (ACM)		Current Site Users	Unlikely	Moderate	Low risk	Asbestos may be present in the Made Ground soils beneath the site However, asbestos is only harmful when disturbed. The site is currently covered by hardstanding and there is therefore no plausible pollutant linkage. The risk to current site users is considered to be **LOW.**
		Adjacent land users	Low Likelihood	Moderate	Moderate to Low risk	Asbestos may be present in the Made Ground soils beneath the site. Disturbance of soil during the construction phase may allow fibres to become airborne. The risk is therefore considered **MODERATE.** Dust control measures (dampening down) should be implemented as part of good site working practices in order to reduce the risk to **LOW**.
		Future land users	Low Likelihood	Moderate	Moderate to Low risk	The proposed commercial development includes areas of soft standing; however, the majority of the site will be covered by hardstanding. Disturbance of potential ACM by future users may allow fibres to become airborne. The risk is therefore considered **MODERATE.** A contamination assessment of the existing on-site soils and appropriate remediation, if required, will reduce the risk to **LOW**.
		Construction Workers	Low Likelihood	Moderate	Moderate to Low risk	Construction workers will be exposed to potential asbestos in soils during the construction phase. The risk is considered **MODERATE.** A contamination assessment of the existing on-site soils would be required to determine the level of risk and necessary mitigation measures.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusion

7.1 The site is currently made up of a restaurant along the southern boundary of the site. The northern section is made up of a macadam car park. There have been a few stages of development on the site. There have been roads cross cutting the site. It then became part of a sports field before being laid out as it is today. There may be contamination associated with these stages of development. Additionally, there may be contamination from the construction of the M60 which runs just north of the site.

7.2 A former landfill is located close to the northern boundary of the site.

7.3 The proposed development of the site includes a commercial foodstore and associated parking.

7.4 The site is underlain by superficial deposits of Devensian Diamicton till and Peat (Unproductive Aquifer) and the solid geology of Pennine Middle Coal Measures (Secondary A Aquifer).

7.5 The overall risk from soil contamination to commercial end users and construction workers is concluded to be **LOW.**

7.6 The risk to controlled waters is concluded to be **LOW** based on the underlying cohesive geology and absence of a nearby abstraction.

7.5 Given the anticipated extent and age of made ground the risk from ground gas to end users is considered to be **MODERATE to LOW**.

7.6 Due to the presence of peat the use of shallow foundations may not be viable.

Recommendations

7.7 An intrusive investigation should be undertaken to establish geotechnical parameters for the design of foundations, floor slabs and pavement construction for the proposed new structures and surrounding area.

7.8 As part of the geotechnical investigation, it is recommended that samples of soil and groundwater samples are recovered for contamination testing and to confirm whether there are any potential risks. Ground gases should also be monitored.

7.9 A Coal Mining Risk Assessment will need to accompany any planning application.

7.10 A pre-demolition / refurbishment asbestos survey should be prepared by a specialist asbestos consultant prior to commencing the development in order to accurately identify suspected ACM.

APPENDIX 1

GROUNDSURE REPORTS

APPENDIX 2

SITE PHOTOGRAPHS

<table>
<tr><td>Earth Environmental & Geotechnical Ltd

Tel: 0161 975 6088
Email: info@earthenvironmental.co.uk
Web: www.earthenvironmental.co.uk</td><td>SITE PHOTOGRAPHS

EARTH ENVIRONMENTAL & GEOTECHNICAL</td></tr>
<tr><td>Job No.: A3469</td><td>Site: Victoria Avenue, Moston</td></tr>
<tr><td>Plate 1 View across site, looking SE</td><td>Plate 2 View across site, looking SW</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Date: 12th March 2020</td><td>Date: 12th March 2020</td></tr>
<tr><td>Plate 3 View of southern site boundary looking E</td><td>Plate 4 View across site looking W</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Date: 12th March 2020</td><td>Date: 12th March 2020</td></tr>
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Figure 9 Site Walkover Photo Locations



APPENDIX 3

SITE WALKOVER NOTES

EARTH ENVIRONMENTAL & GEOTECHNICAL

WALK OVER SURVEY REPORT

Site: Victoria Avenue, Moston **Date:** 12th March 2020

Job No: A3469/20 **Undertaken By:** Alice Barrington

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)		 Suburb Residential and retail Restaurant along southern boundary. Car park in northern area
Evidence of Past Activities	Are there: Any relevant street names in area? Features or relics which indicate past history?	 Yes/~~No~~ ~~Yes~~/No	 Victoria Avenue East runs directly south of the site. Only current use visible
Geographic Setting	Description required for: Low lying flood plain/dry valley/rolling hills etc.		Flat and level
Ground Conditions	Is there any evidence of: Mining, Mine entries Subsidence Landslip/slope erosion Former investigation works	 ~~Yes~~/No ~~Yes~~/No ~~Yes~~/No	

Desk Study features checked during site visit	**Feature and Information required**	**Present**	**Description / Comments**
Topography	Description required for: Are there apparent differences between site and surrounding area? (If yes describe the presence of retaining walls, and slopes). Is there evidence of Made Ground / Fill on site?	~~Yes~~/No Yes/~~No~~	 The area of soft cover in the north west is slightly raised – potentially fill.
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)		Northern and eastern boundaries are made of black metal fencing. The southern boundary is made up of the building. The western boundary is made up of the building, some black metal fencing and some of it is open. To the north is the M60. East is a playing field. South and west are residential properties. Residential areas to the south and west.
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	The north west corner is covered in grass and medium sized birch trees. There is grass along the northern and eastern boundaries. Some small hedges in the centre of the site.
Ground Surface	Are there areas of hardstanding and estimate the split between hard and soft cover? (If yes describe locations, types and conditions). Is the any evidence of any spillages or staining?	Yes/~~No~~ ~~Yes/~~No	95:5 hard to soft standing. The hardstanding is macadam. The soft standing is the aforementioned grassy area in the north west corner of the site.

Desk Study features checked during site visit	**Feature and Information required**	**Present**	**Description / Comments**
Site Drainage	Are there any drain covers / soakaways (if yes describe locations) Are there any outfalls/water courses on site (note the condition of water courses in open water courses. discolouration, odour, eutrophication, oily sheen, gas bubbling water, clear or cloudy) Where a watercourse runs alongside or crosses a site are there any differences in visible water quality upstream and downstream of the site?	Yes/~~No~~ ~~Yes/~~No ~~Yes~~/No	Dotted across the site. Usually found on or near paths and buildings. Lots found near the site entrance.
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	No, but lots of streetlights across the site.
Buildings	Is there any evidence of asbestos construction materials e.g. roofing, insulation materials. Do any buildings have basements? Do any buildings have a boiler room (if yes, describe fuel type and storage arrangements)?	Yes/No Yes/No Yes/No	Cannot get access to the building but is new so would assume not present. Unknown Unknown

Desk Study features checked during site visit	**Feature and Information required**	**Present**	**Description / Comments**
Landfilling	Is there any evidence of gas protection measures (gas membrane, gravel-filled trenches, venting pipes, etc)?	~~Yes~~/No	
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	
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	Present but only small oil and gas ones. Cannot get access to check if full. Associated with the restaurants on site.
Accidents	In the event of a large spillage would runoff affect any vulnerable watercourse/culverts? Are emergency procedures / equipment in place?	~~Yes~~/No ~~Yes~~/No	

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Waste	Are there any waste skips present on site? Are waste storage facilities adequate? Is there any litter/fly tipped material?	~~Yes~~/No ~~Yes~~/No Yes/No	 Household waste along northern boundary.
Atmospheric	Are there any fumes, odours originating from site or affecting site from neighbouring sites?	~~Yes~~/No	
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		None None Potentially from the buildings onsite.
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	There is an industrial concrete block with access hatches and vents just north of the site. Use is unknown.
Local Knowledge / Anecdotal Evidence			
Site Dimensions	Describe shape of Site in plan and measure dimensions.		

APPENDIX 4

REPORT LIMITATIONS

LIMITATIONS

This contract was completed by Earth Environmental & Geotechnical Ltd 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.