



**Earth Environmental**  
& Geotechnical

## Phase 1 GeoEnvironmental Assessment

Hardman House

Liverpool

March 2017

On behalf of

Carpenter Investments Ltd

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

Tel : 0161 975 6088

Email [info@earthenvironmental.co.uk](mailto:info@earthenvironmental.co.uk)  
[www.earthenvironmental.co.uk](http://www.earthenvironmental.co.uk)



**HARDMAN HOUSE**  
**LIVERPOOL**  
**PHASE I GEOENVIRONMENTAL ASSESSMENT**  
**FOR**  
**CARPENTER INVESTMENTS LTD**

Earth Environmental & Geotechnical Ltd.  
Houldsworth Mill Business & Arts Centre  
Houldsworth Street  
Stockport  
SK5 6DA  
Tel 0161 975 6088

**Report No. A1530/16**

**March 2017**

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<b>Drafted By:</b>	<b>J Harris</b>
<b>Reviewed By:</b>	<b>A Czarnecki</b>
<b>Authorised By:</b>	<b>A Czarnecki</b>

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## **1.0 INTRODUCTION**

### **Appointment**

- 1.1 Earth Environmental & Geotechnical was commissioned by Carpenter Investments Ltd (the client) to undertake a Phase 1 GeoEnvironmental Desk Study on land on Hardman Street, Liverpool.
- 1.2 It is understood that planning permission is being sought for the complete demolition of buildings presently on site and redevelopment to retail, commercial and residential apartment units.

### **Objective**

- 1.3 The purpose of the Phase 1 Report is to collate available geological and environmental data for the site (and its environment) in order to provide a preliminary geotechnical and geo-environmental appraisal, together 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**

- 1.4 The Phase 1 Environmental Desk Study comprises of 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).
  - The Coal Authority Interactive Map Viewer.
  - Liverpool City Council Planning Portal.

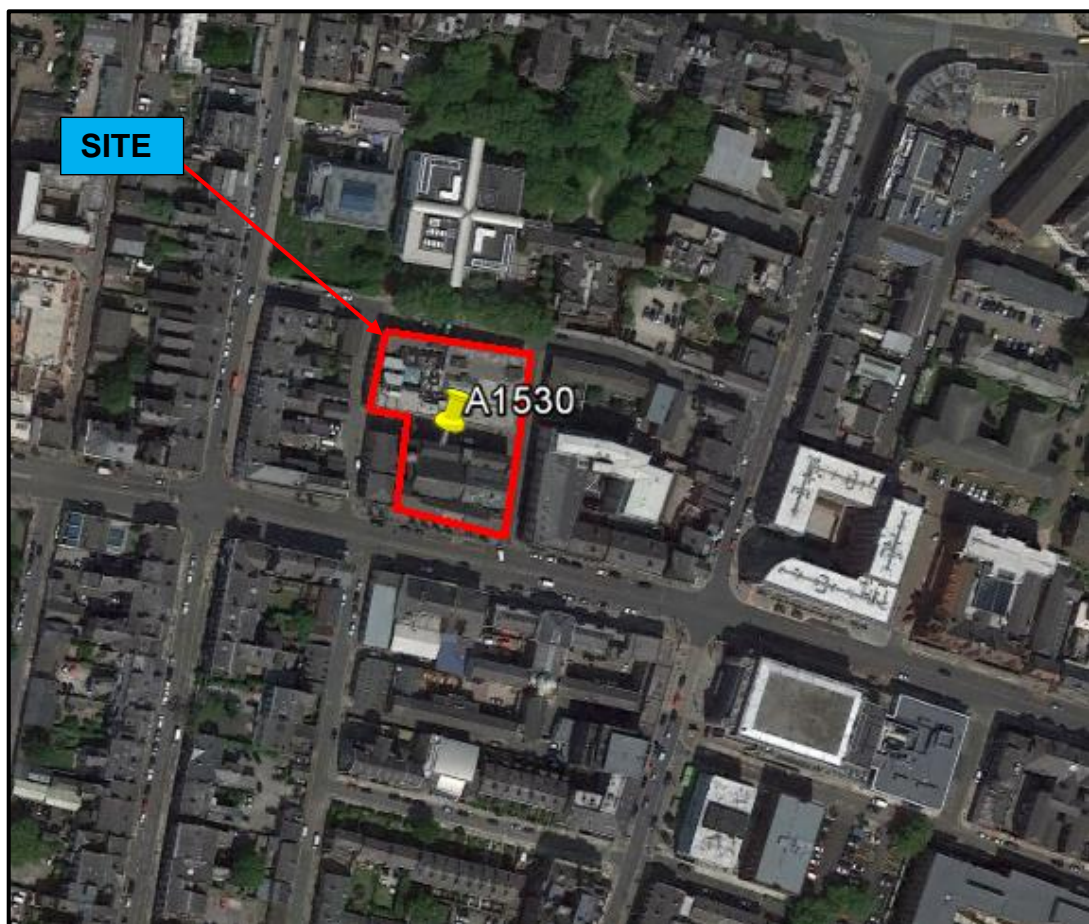
## 2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site is currently fully occupied by two large blocks of terraced buildings separated by Back Maryland Street through the centre of the site.

### Site Location

- 2.2 The site is located 1.5km southeast of Liverpool City centre in the Georgian District within a mixed commercial and residential setting. The approximate National Grid Reference for the site is SJ 35482 89931 (335482, 389931) with the nearest postcode L1 9AS.
- 2.3 The site occupies approximately 0.32ha, on a rectangular shaped plot of land approximately 55m wide and 65m long and is bound by Hardman Street to the south, South Hunter Street to the east, Maryland Street to the north and Baltimore Street to the west. The site is surrounded by high rise mixed commercial and residential buildings. The west portion of the site is bound by terraced buildings used for commercial and residential use.
- 2.4 A location plan is shown below as Figure 1.

**Figure 1: Site Location Plan**



- 2.5 The site is accessed from Hardman Street south of the site, South Hunter Street to the east and Maryland Street to the north.
- 2.6 The site and surrounding area dips moderately to the west.

#### **Site Utility Services**

- 2.7 A site service plan has been not provided by the client. The status of all services should be checked with the statutory providers 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 ground.
- 3.4 The BGS states that the site is not underlain by superficial deposits.
- 3.5 This site is directly underlain predominantly by the Helsby Sandstone Formation which consists of fine- to medium-grained, locally micaceous, cross-bedded and flat-bedded sandstones. There is also a band of Tarporley Siltstone Formation at the southwestern corner of the site which consists of interlaminated and interbedded siltstones, mudstones and sandstones in approximately equal proportions.
- 3.6 There are 3 records of geological faults within 500m of the site, with an inferred fault of unknown displacement running through the southwestern corner of the site, oriented approximately north-south.
- 3.7 There are no records of any landslip activity within 500m of the site boundary.
- 3.8 There are 8 BGS public borehole records identified within 250m of the site, the closest of which is 59m east, SJ38NE1 Liverpool Radium Institute, consisting of sand and clay overlying sandstone.
- 3.9 The site is in an area where the hazard rating is negligible or very low with regard to shrink-swell clays, landslides, ground dissolution of soluble rocks, compressible deposits, collapsible deposits and running sands.
- 3.10 The maximum hazard rating of natural subsidence within the site has been classified as very low by the BGS.
- 3.11 There are 4 estimated background soil chemistry records within 250m of the site, two of which are located on site.

#### **Ground Workings**

- 3.12 There are no historical surface ground working records identified within 250m of the site.
- 3.13 There are 4 current ground working records within 1km of the site, the closest of which is Old Park, a ceased sandstone quarry, 507m south of the site.
- 3.14 There is a railway tunnel 243m west of the site.



- 3.15 There are 34 historical railway lines or railway tunnel features identified within 250m of the site, the closest of which is a tunnel 218m south of the site, dated 1928.
- 3.16 There is an abandoned historical railway line 250m south of the site.
- 3.17 There is 1 active railway line within 250m of the site, the Merseyside Northern Line 242m west of the site.

### **Mining and Other Underground Workings**

- 3.18 There are 8 historical mining areas within 1km of the site, the closest of which is an unspecified shaft, 257m southeast of the site, dated 1965.
- 3.19 There are no non-coal mining areas within 1km of the site.
- 3.20 There are no coal mining areas within 1km of the site.
- 3.21 There are no areas of brine extraction, gypsum extraction, tin mining or clay mining within 1km of the site.
- 3.22 There are no non-coal mining cavities or natural cavities identified within 1km of the site.
- 3.23 There are 74 historical underground working features identified within 1km of the site, the closest being a disused tunnel 246m south of the site, dated 1938.
- 3.24 There are no current underground railway lines, features or tunnels within 250m of the site.

### **Radon Potential**

- 3.25 The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
- 3.26 No radon protective measures are necessary.

### **Hydrogeology and Hydrology**

- 3.27 The underlying Helsby Sandstone Formation is classified by the Environment Agency (EA) as a Principal Aquifer, with a mixed flow type and high maximum and moderate minimum permeability. The BGS states the following:

*'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.'*

- 3.28 The underlying Tarporley Siltstone Formation is classified by the Environment Agency (EA) as a Secondary B Aquifer, with a fracture flow type and moderate maximum and low minimum permeability. The BGS states the following:

*'Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.'*

- 3.29 The groundwater vulnerability and soil leaching potential on site has been given a HU soil vulnerability category within a major aquifer with high leaching potential, where the EA states:

*'Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.'*

- 3.30 There are no groundwater, surface water or potable water abstraction licence records within 1.0km of the site.
- 3.31 The site is not within 500m of a groundwater Source Protection Zone.
- 3.32 The site is not within 500m of a Source Protection Zone within a confined aquifer.
- 3.33 There are no detailed river network records within 500m of the site.
- 3.34 There are no surface water features identified within 250m of the site.
- 3.35 There are no river quality records within 1.5km of the site.

#### **Landfill and Waste Management Activity**

- 3.36 There are 36 records of historical potentially infilled land identified within 500m of the site, the closest of which is an unspecified shaft 197m southeast of the site, dated 1989. Also in the vicinity are unspecified shafts, cemeteries, tunnels and unspecified heaps.
- 3.37 There are 4 historical EA landfill site records within 1.5km of the site, the closest of which is located at the corner of Smithdown Lane, 999m east of the site, last recorded in 1993.
- 3.38 There is 1 waste treatment, transfer or disposal site record within 1.5km of the site, a recycling unit 180m southwest of the site.
- 3.39 There are 7 EA licenced waste sites within 1.5km of the site, the closest being a clinical waste transfer station 941m northeast of the site.
- 3.40 There are no other landfill or waste site records with 1.5km of the site.

#### **Industrial Land Use Information**

- 3.41 There are 93 records of historical potentially contaminative land uses identified within 500m of the site, the closest of which is a police station 25m south of the site. Also in the vicinity are other police stations, hospitals, unspecified workhouses, unspecified shafts, cemeteries, tunnels, unspecified heaps, railway sidings, railway buildings abattoirs, a fever hospital, unspecified commercial/industrial uses, sheds, an infirmary and lunatic hospital.

- 3.42 There are 26 records of current potentially contaminative industrial sites identified within 250m of the site, the closest of which is an electricity substation 74m east of the site. Also in the vicinity are disability and mobility equipment, unspecified works or factories, electricity substations, vehicle hire and rental, civil engineers, armed services, tanks, vehicle repair, testing and servicing, new vehicles, construction completion services, medical equipment, supplies and pharmaceuticals, published goods, lampshades and lighting, business parks and industrial estates and a furniture store.
- 3.43 There are 18 records of historical tanks within 500m of the site, the closest of which is an unspecified tank 169m northwest of the site, dated 1970.
- 3.44 There are 108 records of historical energy features identified within 500m of the site, the closest of which is an electricity substation, 71m east of the site dated 1977.
- 3.45 There are no historical petrol or fuel sites within 500m of the site.
- 3.46 There are no current petrol or fuel site within 500m of the site.
- 3.47 There are 132 historical garages or motor vehicle repair sites identified within 500m of the site, the closest of which is a garage 8m east, dated 1977.
- 3.48 There are no National Grid high voltage underground electricity transmission cables, or high pressure gas transmission pipelines within 500m of the site.

### Environmental Permits, Incidents and Registers

- 3.49 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**

Historic IPC Authorisations	None
Part A (1) and IPPC Authorised Activities	None
Red List Discharge Consents	None
List 1 Dangerous Substances Inventory Sites	None
List 2 Dangerous Substances Inventory Sites	None
Part A (2) and Part B Activities and Enforcements	1
Category 3 or 4 Radioactive Substance Authorisations	7
Licensed Discharge Consents	None
Water Industry Referrals	None
Planning Hazardous Substance Consents and Enforcements	None
Dangerous or Hazardous (COMAH and NIHHS) Sites	None
National Incidents Recording System (Pollution Incidents), List 2	2
National Incidents Recording System (Pollution Incidents), List 1	None
Sites Determined as Contaminated Land under Part 2A EPA1990	None

- 3.50 The Part A (2) and Part B Activities and Enforcements Bell relates to coating and enamelling processes, 357m west of the site. No enforcements are notified.
- 3.51 The only effective Category 3 or 4 Radioactive Substance Authorisation relates to the disposal of radioactive waste at the University of Liverpool, last recorded 01<sup>st</sup> January 2015.
- 3.52 The closest National Incidents Recording System (Pollution Incidents), List 2 relates to an incident that occurred on 15<sup>th</sup> January 2003, 185m northwest of the site. The pollutant was construction and demolition materials and waste which was classified as having minor impact to land.

### **Environmentally Sensitive Sites**

- 3.53 A DEFRA Nitrate Vulnerable Zone lies 1.6km northeast of the site.
- 3.54 The site is located within the Liverpool – Maritime Mercantile City Buffer Zone World Heritage Site.
- 3.55 There are no other environmentally sensitive site records within 2km of the site.
- 3.56 It should be noted that an ecological assessment of the site falls outside the brief of this report and that an ecological specialist should be consulted in this regard.

### **Archaeology**

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

### **Potential Flood Risks**

- 3.58 Detailed assessment of flood risks is outside the scope of this report. However, the site does not lie with 250m of 2 Environment Agency Zone 2 (Fluvial/Tidal Models) or a 2 Zone 3 (Fluvial Models) floodplain. The highest risk of flooding on site is very low.
- 3.59 There are no flood defences, areas benefitting from flood defences or areas used for flood storage within 250m of the site.
- 3.60 According to the BGS there are areas within 50m of the site boundary that may be susceptible to clearwater flooding. The highest susceptibility to groundwater flooding is 'limited potential' and the BGS confidence rating is low. The BGS states:

*'Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.'*

### **Previous Site Investigations**

3.61 We are not aware of any records of previous site investigations.

## 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 1850.

4.2 The site history is summarised in the Table 2 below.

**Table 2: Summary of Site History**

Date	Site	Surrounding Land Use
1850, 1850-1851	<p>St Philips Church and graveyard are located between Hardman Street and Back Maryland Street.</p> <p>A row of terraced houses is also present in the northern segment of the site fronting Maryland Street.</p>	<p>Site is surrounded by large residential buildings with landscaped gardens.</p> <p>Jew's Synagogue ~30m S of the site.</p> <p>Stone yard ~150m E of the site.</p> <p>Burial ground ~50m NW of the site.</p> <p>Workhouse ~230m NE of the site.</p> <p>Timber Yard ~310m NW of the site.</p> <p>Timber Yard ~220m WNW of the site.</p>
1891, 1893, 1894	<p>Site is now occupied by terraced buildings along Hardman Street and Back Maryland Street with an open central portion.</p>	<p>Consumption Hospital ~150m NW of the site.</p> <p>Printing Works ~100m SE of the site.</p> <p>Hospital ~90m SW of the site.</p> <p>Electrical Supply Works ~160m NW of the site.</p> <p>Victoria Works ~70m NW of the site.</p> <p>Saw Mill and Timber Yard ~210m NW of the site.</p> <p>Railway line and terminus ~285m WNW of the site.</p> <p>Smithy 285m WNW.</p> <p>Tramline ~180m N of the site oriented E-W.</p>
1908, 1910, 1927, 1928	<p>Entire site is covered in two blocks of buildings in a similar layout to today.</p> <p>Church marked on site 1927.</p>	<p>Warehouses ~300m SW of the site.</p> <p>Tunnel 250m SE of the site, oriented NE-SW.</p> <p>Tunnel 250m SW of the site oriented N-S.</p> <p>Stables ~130m E of the site.</p>
1954, 1954-1957, 1955, 1956-1958, 1959-1968, 1969, 1973-1982, 1983-1987, 1983-1991	<p>1 large building on site along Hardman Street labelled Atlantic House.</p>	<p>Large garage 25m E of the site.</p> <p>Warehouse ~100m SE of the site.</p> <p>Hospital ~160m NE of the site.</p> <p>Laboratories ~210m NE of the site.</p> <p>4 garages ~110m NW of the site.</p> <p>Foundry ~160m NW of the site.</p>

		<p>Clothing Factory 370m SW of the site.</p> <p>Garage 350m SW of the site.</p> <p>Clothing factory 35m W of the site.</p> <p>Garage 70m SE of the site.</p> <p>Terraced surgeries 65m SW of the site.</p> <p>Police station 30m S of the site (1969).</p> <p>Shafts ~240m W and ~360m SW of the site along tunnel.</p>
<p>GoogleEarth Aerial Photograph</p> <p>2000, 2003, 2005, 2007, 2009, 2010, 2012, 2015</p>	<p>Site is as seen today.</p>	<p>No significant changes.</p>

4.3 Selected extracts from historical maps and aerial photographs are presented overleaf.



Figure 2: OS Map Extract 1908

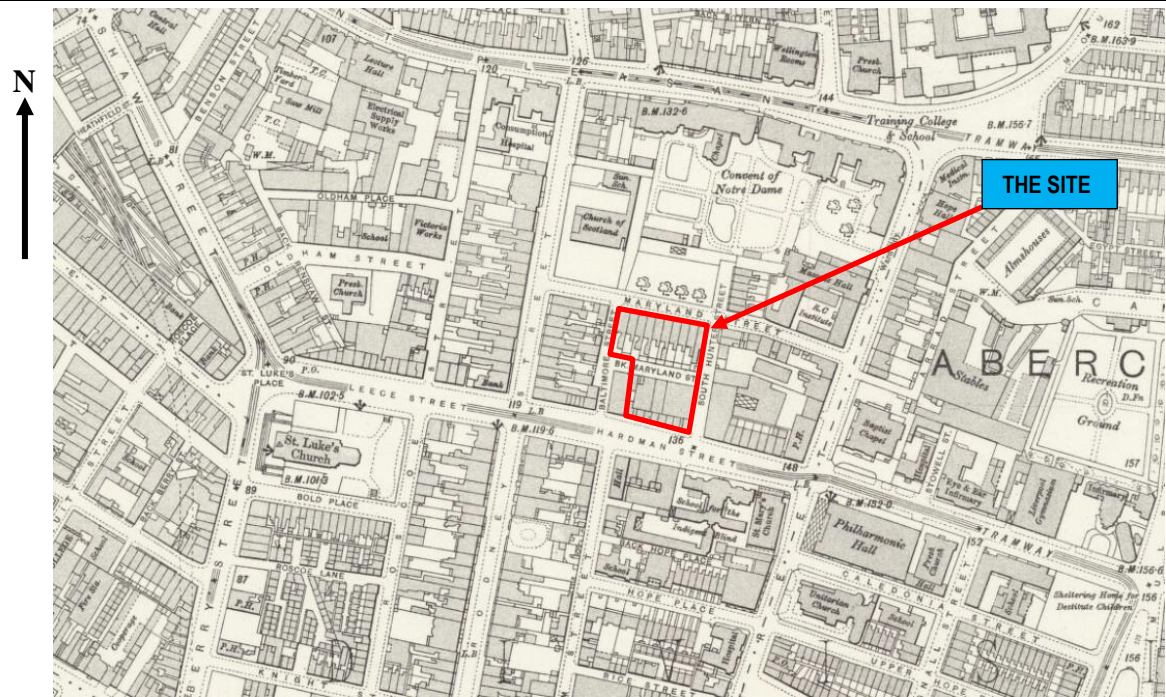


Figure 3: Google Earth Extract 2016



## 5.0 PRELIMINARY CONTAMINATION RISK ASSESSMENT

### Introduction

- 5.1 The following paragraphs outline a Preliminary Risk Assessment (PRA) for the site as defined by DEFRA and the EA Model Procedures for the Management of Land Contamination, CLR11 (2004).
- 5.2 The table in Paragraph 5.4 provides a Preliminary Conceptual Model (PCM) which defines the site in terms of a potential pollution linkage, that is, whether a pathway exists between a contamination source and a sensitive environmental receptor (Source-Pathway-Receptor relationship).
- 5.3 The table 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.
- 5.4 The PCM/PRA is based on a proposed mixed commercial and residential end use.

**Table 3: Preliminary Conceptual Model**

Source	Pathway	Receptor	Linkage	Comment
The likelihood of significant ground contamination sources being present at the site is considered <b>LOW</b> .	Direct contact, ingestion of soil, dermal contact, dust exposure pathways.	Current Site Users	Unlikely	The risk to current site users via direct exposure is considered to be <b>LOW</b> .
		Adjacent land users	Unlikely	The risk is considered <b>LOW</b> , although usual dust control measures should be implemented as part of good site working practices during construction.
		Future land users	Unlikely	Soil contamination may be present. There are no proposed garden areas, therefore the risk to future site users via direct exposure is considered to be <b>LOW</b> .
		Construction Workers	Possible	Assuming appropriate Health and Safety measures are adopted during the works, a <b>LOW</b> preliminary risk to construction workers is identified.
	Root uptake.	Ecology	Unlikely	The risk of distress to plants on the site as a result of soil contamination is considered to be <b>LOW</b> .

Considering the historical land use of the site and immediate surrounding area, the likelihood of significant sources of soluble and/or liquid and therefore mobile contaminants occurring at the site is considered <b>LOW</b> .	Direct downward migration through leaching and/or mobile liquids.	Groundwater	Possible	Potential minor sources of mobile contamination are identified on the site and the site lies upon a Principal and Secondary B Aquifer. The perceived risk to groundwater is considered <b>LOW</b> .
	Off-site migration in groundwater or surface water flow.	Surface water	Possible	Potential minor sources of mobile contamination are identified on the site. There are no surface water features in the area. The perceived risk to surface water is considered <b>LOW</b> .
		Groundwater / surface water abstractions	Unlikely	Potential minor sources of mobile contamination are identified on the site. There are no abstraction licences nearby, the perceived risk to water abstractions is considered <b>NEGLIGIBLE</b> .
		Adjacent Properties	Unlikely	Potential minor sources of mobile contaminants associated with the site, the preliminary risk to adjacent properties is considered <b>LOW</b> .
		Ecology	Unlikely	Considering potential minor sources of mobile contaminants associated with the site, yet the absence of sensitive ecological receptors in the vicinity, the risk to ecology is <b>LOW</b> .
The likelihood of significant volatile contaminants occurring at the site is considered <b>LOW</b> .	Inhalation of harmful vapours (indoor and outdoor airspaces)	Current Site Users	Unlikely	Recognising the nature of the site, it is unlikely that there will be a build-up of any harmful gases or vapours. The risk associated with current site users is considered to be <b>LOW</b> .
		Future site Users	Possible	No sources of significant volatile contamination are identified on the site. Modern construction practices will provide a barrier and ventilation. The risk associated with future site users is considered to be <b>LOW</b> .
		Adjacent Properties	Possible	The potential risk to adjoining site users is considered <b>LOW</b> .
The likelihood of degradable materials with the potential to generate hazardous ground gas is <b>MEDIUM</b> .	Emissions from the ground collecting in confined spaces and excavations	Construction/ services maintenance workers	Unlikely	Considering the potential for exposure the preliminary risk is <b>LOW</b> .
	Migration of gases on/off site and collecting in confined spaces on/off site.	Adjoining site users	Unlikely	Minor sources of potentially degradable materials are identified on site and in the immediate vicinity. The potential risk to adjoining site users associated with the site is considered <b>LOW</b> .
		Current/future site users	Unlikely	The proposed residential end use represents sensitive receptors. The potential risk is therefore considered <b>LOW to MEDIUM</b> .

Chemicals which could prove aggressive to construction materials may be present on site. <b>LOW.</b>	Direct contact	Construction concrete, plastic water pipes.	Unlikely	Risks to construction materials can be identified via site investigation prior to the proposed construction works. The perceived risk is considered <b>LOW.</b>
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### Preliminary Risk Assessment

- 5.5 The site has been a church with a graveyard with several buildings on site at differing times, with the building layout similar to today on site since 1908.
- 5.6 The majority of the potential pollution linkages are considered unlikely and preliminary risks assessed as low.

## **6.0 CONCLUSIONS AND RECOMMENDATIONS**

- 6.1 The likelihood of contamination on the site is overall low.
- 6.2 The proposed residential development represents sensitive receptors with no major potentially contaminative uses within the vicinity of the site.
- 6.3 The site has contained buildings along Maryland Street since at least 1850 and buildings along Hardman Street since 1908, prior to this being a church with a graveyard.

### **Recommendations**

- 6.4 An intrusive investigation should be undertaken to establish geotechnical parameters for the design of foundations, floor slabs and pavement construction for the proposed new build and surrounding area.
- 6.5 As part of the geotechnical investigation, it is recommended that samples of soil are recovered, particularly in any proposed landscaped areas, for analysis for contamination and to confirm whether there are any residual risks.
- 6.6 As part of the site investigation, it is recommended that ground gas installations and monitoring are completed to confirm whether there are any residual risks.
- 6.7 An asbestos survey is recommended prior to the demolition of the existing buildings on site.

## **APPENDIX 1**

### **GROUNDSURE REPORTS**

## **APPENDIX 2**

### **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.

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The report was written in 2016 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.