

Mugen Geo Ltd.

PHASE 1 DESK STUDY & GEO-ENVIRONMENTAL APPRAISAL

LAND ADJACENT
SCAR MILLS
LOCKWOOD SCAR
LOCKWOOD
HUDDERSFIELD
HD4 6BP

Document Status: DRAFT
Revision: v1

For
Visionary Homes Bradford Ltd
1 Oakroyd Terrace
Bradford
BD8 7AE

Prepared by Mugen Geo Ltd
Machpelah House,
Hebden Bridge HX7 8AU
www.mugengeo.co.uk

Job N° MGEO 1902 HD6 4BP

Date: February 2019

Executive Summary and Conceptual Site Model

Site Setting	Client	Visionary Homes Bradford Ltd
	Site	Land adjacent Scar Mills Lockwood Scar Lockwood Huddersfield HD4 6BP
	Site Location	NGR 413845E 415104N
	Current Land Use & Development Proposal	This report has been prepared in support of the planning application for a residential premises at the site.
Conceptual Site Model Potential Pollutant Linkages	Site History	The site was occupied by buildings forming part of Scar Mills from at least 1852 and this use prevailed until sometime after 2002.
	Surrounding Area	Surrounding land of mixed commercial and residential use in Lockwood to the south of Huddersfield centre.
	Geology	BGS records indicated the site undifferentiated Alluvium of clay, sand and gravel 10m to the north west of the site. The site itself is indicated to be underlain by interbedded sandstone mudstones siltstones of the Pennine Lower Coal Measures Formation of Carboniferous age.
	Hydrogeology	The aquifers within the bedrock deposits are designated as 'Secondary A'. These are described as 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.
	Possible pollutant linkages on undeveloped site determined from a desk study and site walkover	
	Preliminary Sources	The historic use of the site with mills and other uses on surrounding land is considered as a potential source of contamination at the site.
	Preliminary Pathways	<ul style="list-style-type: none"> • Ingestion, inhalation or direct contact • Leaching through unsaturated zone • Direct contact with free phase or dissolved phase • Fugitive dust • Migration through Soils or groundwater to indoor air
	Potential Receptors	<ul style="list-style-type: none"> • Site Workers • End users of the site • Neighbours • Groundwater and possible abstractors or aquatic ecosystems • Building Products
Summary Findings	The historic use of the site and adjoining land for mills and other uses is generically considered as potential sources of contamination. Based on the past history of the site the probability of contamination being present sufficient to affect the identified existing receptors is considered to be a moderate risk. The current uses of the site were considered to have been a low risk of causing pollution or transferring contaminants beyond the confines of the site. The future site usage as identified in the prepared development is likely to be low risk. In this context, the significance of the conditions identified and the likelihood that risk and liability will be realised cannot be determined from the findings of the Phase I environmental review at this stage, and uncertainty remains	

		with respect to determination of actual risks presented. A limited site investigation is recommended prior to development of the site.
--	--	--

This is only a summary. The full report should be considered in its entirety.

Table of Contents

1	Introduction.....	1
1.1	Scope and objective of the report.....	1
1.2	Information Sources.....	1
1.3	Limitations.....	2
2	Site Location and Description.....	3
2.1	Site Location.....	3
2.2	General Description of Site & Proposal.....	4
2.3	Surrounding Area.....	4
2.4	Site History.....	5
3	Geo-environmental Setting.....	7
3.1	Geology.....	7
3.1.1	Regional Setting.....	7
3.1.2	BGS Borehole Viewer.....	7
3.2	GroundSure EnviroInsight Report.....	7
3.2.1	Environmental Permits, Incidents & Registers.....	8
3.2.2	Landfill and Other Waste Sites.....	8
3.2.3	Current Land Uses.....	8
3.2.4	Sensitive Land Use.....	9
3.2.5	Mining.....	9
3.3	Radon.....	9
3.4	Hydrogeology.....	9
3.5	Hydrology.....	10
3.5.1	Surface Waters.....	10
3.5.2	Flooding.....	10
4	Preliminary Conceptual Site Model.....	12
4.1	Introduction.....	12
4.1.1	Legislative Background.....	12
4.2	Preliminary Conceptual Site Model.....	13
4.3	Sources.....	14
4.4	Pathways.....	14
4.5	Receptors.....	14
4.6	Qualitative Risk Assessment.....	19

4.6.1	Preliminary Assessment	19
5	References	20

Appendix A – Site Location Plans

Appendix B – Environmental Data

Appendix C – Site Photographs

Appendix C – Trial pit Logs August 2017

Note: This report has been formatted to be read as a PDF.

1 Introduction

Mugen Geo Ltd (Mugen Geo) was commissioned, on behalf of Visionary Homes Bradford Ltd to carry out a Phase 1 preliminary ground investigation of 'Land adjacent Scar Mills Lockwood Scar Lockwood Huddersfield HD4 6BP' (the site).

1.1 Scope and objective of the report

This report has been prepared in support of a planning permission for a new residential development.

This report has been developed in accordance with the YAHPAC Technical Guidance for Developers Landowners & Consultants 2011 (Ref 12), CLR11 (Ref. 1), and other best practice guidance cited at the end of this report.

The Phase 1 Preliminary Risk Assessment comprised a desk-based review of current and historical information, environmental, geological and hydrological information, together with the findings of a site walkover.

The simple purpose of this report is to identify the following (Ref: 13):

- Identify whether contaminative uses are/have potentially been present on/nearby the site
- Identify potential receptors
- Identify potential pathways
- Identify whether there are possible significant pollutant linkages
- Collect information for the Conceptual Site Model (CSM)
- Set the objectives for any site investigation (or state why none is required)

1.2 Information Sources

This report has been prepared from published information and information provided by the client and other parties, including anecdotal information.

The supplied regulatory data and historical OS maps obtained from Groundsure provide an environmental database that includes information from the following organisations:

- Environment Agency
- British Geological Survey
- Ordnance Survey
- Coal Authority
- Health Protection Agency
- Natural England

- Department for Environment, Food and Rural Affairs (DEFRA)

The study has not included checks on services on or adjacent to the site, and no structural, ecological or asbestos surveys have been carried out.

1.3 Limitations

This report has been prepared for the sole use and reliance of the Client named above and cannot be relied upon by any other parties without the express written authorisation of Mugen Geo Ltd. Any unauthorised third party relies on this report at their own risk and the authors owe them no duty of care.

Draft versions of this report cannot be relied upon and Mugen Geo Ltd accept no liability for decisions made based upon any draft versions circulated as part of project development. Please refer to the FINAL report only for decision making purposes.

The findings and opinions conveyed in this report is based on information obtained from sources which Mugen Geo Ltd believe are reliable. All reasonable endeavours have been made to source the information from reputable organisations; however, Mugen Geo Ltd accepts no responsibility for inaccuracies in the data supplied or for opinions based on any such inaccurate data. No attempt has been made to independently verify any data collected by others or from other sources. The Report does not constitute any legal advice. As such, the advice of a Solicitor may also be required.

The purchased environmental dataset reports are based upon known, published information and may not comprise a complete record of all features of relevance. An explanation of the datasets used, their sources, assumed definitions and limitations is available on request.

Mugen Geo Ltd reserves the right to amend their conclusions and recommendations in the light of further information that may become available.

2 Site Location and Description

2.1 Site Location

The site was an irregular shaped parcel of land adjacent to Scar Mills in Lockwood Scar Lockwood to the south of Huddersfield centre as shown in Figures 1 & 2 below.

The site development plan is presented in Appendix A.

Site details are summarised in Table 2.1 below:

Detail	Remarks
Location	Land adjacent Scar Mills Lockwood Scar Lockwood Huddersfield HD4 6BP
NGR	NGR 413845E 415104 N
Area	0.18ha
Known services	Underground sewers, drainage, gas, electric, water cable/telecoms

Table 2.1 – Site Summary



Figure 1 Extract of Location Plan

2.2 General Description of Site & Proposal

A site visit was undertaken by Mugen Geo on the on 7th February 2019 to examine the current site condition. The immediate surroundings of the site were observed from public rights of way. No visual evidence of contamination was identified.

The site was an irregular shaped parcel of vacant land.

It was accessed from Lockwood Scar which forms the southern site boundary. Enoch Road forms part of the eastern boundary along with Scar Mills which has been converted to residential apartments. The hoarding forming a boundary at Enoch Rd had been damaged and there was evidence of ongoing fly-tipping as seen in the site photos included as appendix C.

No evidence of Japanese Knotweed or other invasive species was identified during the site walkover, however, a detailed inspection of the fauna was not undertaken.



Map data ©2019 Google

Figure 2 – Indicative site location map

2.3 Surrounding Area

Surrounding land was of mixed commercial and residential use.

2.4 Site History

The historic development of the site and surrounding land has been summarised with reference to available map records. Historically, maps were updated at regular intervals, providing a record of site uses and changes in use over time, however, they only provide a 'snapshot' of land use at the time of the survey and activities that may have taken place between surveys is not known and in some cases sensitive information (such as military sites) would not be recorded.

The history of the site has been studied in order to identify any potential contaminative past uses of the site and immediate environs. A copy of the historic maps is included within appendix B of this report. The marked site boundary in the older map records may appear offset due to a change in Ordnance Survey benchmarks that result from improvements in surveying accuracy.

Date	Information Source	Land Use of Site	Land Use of Surroundings
1854	County Series 1:10,560 scale	The site is occupied by buildings and structures.	Buildings and structures are marked immediately south of the site, 'Woodton Coal Pit' (spelling uncertain) and Sandstone Quarry marked approximately 250m north east of the site.
1890-1893	County Series 1:500 scale 1:2,500 scale 1:10,560 scale	The site forms part of a complex of buildings at Scar Mills. 'Coal Pit Lane' forms the western boundary at the site and several buildings and structures are marked. Benchmarks highlight the sloping ground to the west of the site.	Enoch Road is marked to the east of the site and Spa Wood is marked to the north of the site. 'Spa Field Works (Mungo Waste' is marked approximately 200m north of the site. The River Holme is marked approximately 90m north west of the site.
1905-1908	County Series 1:10,560 scale 1:2,500 scale	No significant changes noted.	Broadfield Mills is marked approximately 50m west of the site.
1913	County Series 1:10,560 scale 1:2,500 scale	No significant changes noted.	No significant changes noted.
1930-1931	County Series 1:10,560 scale	No significant changes noted.	No significant changes noted.
1938	County Series 1:10,560 scale	No significant changes noted.	No significant changes noted.
1958-1960	County Series 1:2,500 scale	No significant changes noted.	No significant changes noted.
1955-19566	National Grid 1:10,560 Scale	No significant changes noted.	No significant changes noted.
1960-1963	National Grid 1:2,500 Scale 1:10,560 Scale	No significant changes noted.	No significant changes noted.
1965-1969	National Grid 1:2,500 Scale 1:10,000 Scale	No significant changes noted.	No significant changes noted.
1970-1977	National Grid 1:2,500 Scale	No significant changes noted.	No significant changes noted.

Date	Information Source	Land Use of Site	Land Use of Surroundings
	1:10,000 Scale		
1984-1988	National Grid 1:10,000 Scale 1:1,250 Scale	No significant changes noted.	No significant changes noted.
1990-1995	National Grid 1:1,250 Scale	No significant changes noted.	No significant changes noted.
2002	1:10,000 Raster 1:10,000 scale	No significant changes noted.	No significant changes noted.
2010	Raster 1:10,000 scale	No significant changes noted.	No significant changes noted.
2014	Raster 1:10,000 scale	No significant changes noted.	No significant changes noted.

Table 2.2 – Historic development of the site and its environs

3 Geo-environmental Setting

3.1 Geology

The British Geological Survey (BGS) 1:50,000 scale map solid & drift Digital Geological Map of Great Britain indicated the site undifferentiated Alluvium of clay, sand and gravel 10m to the north west of the site. The site itself is indicated to be underlain by interbedded sandstone mudstones siltstones of the Pennine Lower Coal Measures Formation of Carboniferous age.

3.1.1 Regional Setting

The area is part of the elevated moorland plateaux of Carboniferous rocks that form the central part of Britain and comprise thick sequences of sediments which have been incised by glacial and alluvial valleys.

The bedrock geology of the District is predominantly of sandstone, siltstone and mudstone. These sedimentary rocks were deposited about 310-315 million years ago during the Carboniferous period. In the late Carboniferous a phase of deformation, part of the Variscan Orogeny, resulted in the development of a complex network of faults across the district.

The present day topography was historically influenced and formed by numerous landslips which occurred across the Yorkshire following the Devensian glacial period approximately 10,000 years ago.

3.1.2 BGS Borehole Viewer

The BGS has made available borehole records taken from the National Geoscience Data Centre and may be used for commercial purposes providing their source is identified. An inspection of the available borehole records did not identify any records within the vicinity and setting of the site that are likely to add additional information regarding ground conditions.

3.2 GroundSure EnviroInsight Report

GroundSure's EnviroInsight report was obtained for the site and is included as part of appendix B. The reports are based on the British Geological Survey (BGS) geological maps, Environment Agency, GroundSure data and miscellaneous other geological and environmental sources.

The reports provide important geo-environmental data for the site and its surroundings and summarises details relating to the site that is useful for development purposes. Only issues that are significant or directly relevant to the conceptual model have been highlighted below for brevity but the data from the reports has been considered in their entirety.

3.2.1 Environmental Permits, Incidents & Registers

There were no historic IPC Authorisations within 500m of the study site.

There were no records of Part A(1) and IPPC Authorised Activities within 500m of the study site.

There were no Water Industry Referral (potentially harmful discharges to sewer) or Red List Discharge Consents record within 500m of the site.

There were no records of List 1 or List 2 Dangerous Substances Inventory Sites within 250m of the study site.

There were no Part A(2) and two Part B Activities and Enforcements within 250m of the study site. The Lockwood (Jet) Filling Station, is recorded 140m south west of the site at Woodhead Road, Huddersfield, HD4 6EP. The Body Shop at 236 Lockwood Rd, Lockwood, Huddersfield, HD1 3TG had an historic permit for 'Respraying of Road Vehicles' 214m to the north west of the site.

There were no records of Category 3 or 4 Radioactive Substance Licences within 500m of the study site

There were eight Licensed Discharge Consents recorded within 250m to the site.

There were no Environment Agency recorded pollution incidents within 250m of the site.

There were no records of any sites determined as contaminated land under section 78R of the Environmental Protection Act 1990.

Environment Agency and Local Authority Data did not identify any other significant authorisations or licenses relevant to the site or within 250m of the site.

3.2.2 Landfill and Other Waste Sites

There were no Environment Agency records of either active or historic landfills within 250m of the site. There were no other EA records within 1000m of the site.

No Local Authority Landfills were recorded within 250m from the site.

3.2.3 Current Land Uses

There were potentially contaminative industrial sites recorded at the site and within 250m of the site that were considered significant. The use of the adjoining site as a Business Park and the electrical sub-station 17m to the north-west boundary of the site are the sources recorded within 50m of the site. Other uses are considered sufficiently distant given the site setting and topography.

There was one fuel site recorded within 250m of the site. This was the Lockwood (Jet) Filling Station, is recorded 140m south west of the site at Woodhead Road, Huddersfield, HD4 6EP.

3.2.4 Sensitive Land Use

The GroundSure EnviroInsight Report records designated environmentally sensitive sites.

No statutory protected ecological sites are identified within 500m of the site.

3.2.5 Mining

The study site is located within the specified search distance of an identified mining area. Coal mining is considered likely to impact the site and a Coal Authority report has been purchased for the site.

The GroundSure EnviroInsight Report records full details of the databases that were reviewed above and are included within appendix B.

3.3 Radon

The site is not within a Radon affected area, as less than 1% of homes are above the action level. No radon protective measures are necessary in the construction of new dwellings or extensions.

3.4 Hydrogeology

Within all aquifers, groundwater tends to flow from areas where groundwater is recharged and follows the topography from elevated escarpments to lower slopes. Variation in groundwater flow directions can occur where local groundwater recharge is impacted by spatial differences in precipitation & surface infiltration rates.

The complexity of the regional fault system of the Carboniferous deposits in the area leads to significant spatial variability in the regional groundwater flow pattern and groundwater contour levels. Faulting can isolate blocks of rock and create new connexions affecting hydraulic conductivity at a local scale. It can also be impacted by coal mining and associated dewatering activities. Due to the complex hydrogeology, the whole sequence is considered in general terms as an aquifer.

Since April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive.

The aquifers within the bedrock deposits are designated as 'Secondary A'. These are described as 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.

Details provided by the Environment Agency in the GroundSure EnviroInsight report, indicate there to be no licensed surface water or groundwater abstraction points within 500m of the site.

There are no source protection zones within 500m of the site.

There were no groundwater or surface water abstraction licenses within 500m of the site.

3.5 Hydrology

3.5.1 Surface Waters

The nearest surface water feature was 78m south west of the site.

3.5.2 Flooding

The data supplied by the Environment Agency in the GroundSure EnviroInsight report indicates that the site is 21m north west of a Zone 2 & Zone 3 flooding area designated to be at risk from flooding from rivers or seas and flood water storage areas.

3.5.2.1 BGS Groundwater Flooding

The British Geological Survey Groundwater Flooding Susceptibility records the site has a very low susceptibility to groundwater flooding. This result is based upon the underlying ground conditions, however, the assessment is noted to be of low accuracy.

Groundwater flooding occurs as a result of water rising up from the underlying rocks or from water flowing from abnormal springs. This tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normally expected and anticipated levels.

Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

A cause of some flooding events in the South Pennines is associated with the characteristic V-shaped valleys of its tributary streams. Heavy rainfall events result in rapid flow increases which cannot be contained in the limited capacity channels, to which the site is unlikely to be affected.

Although the GroundSure EnviroInsight report provides information on flood risk, this does not constitute a full flood risk assessment for the site. The flood risk information

provided does not account for flooding from other sources such as blockages to drainage systems etc.

4 Preliminary Conceptual Site Model

4.1 Introduction

A Conceptual Site Model (CSM) is intended to provide a testable representation of the environmental processes on a site and in its vicinity. Its purpose is to identify potential contaminants, pathways & receptors with a view to identifying (initially) potential and (eventually) significant pollutant linkages (Ref. 13 CLM: Ready Reference 2007).

4.1.1 Legislative Background

In terms of the planning system the legislative approach taken has been that land affected by contamination must be made suitable for use if and when it is redeveloped, and as a minimum it cannot be "contaminated land" in terms of the "Part 2A" contaminated land regime once it has been redeveloped.

The contaminated land regime consists of three main elements: the 1990 Act, the Statutory Guidance, and the Contaminated Land Regulations 2006. Annex 3 gives a brief description. The Statutory Guidance is intended to explain key parts of the 1990 Act, and to set legally binding rules on how they should be applied by the regulator. Its main purpose is to:

- explain how local authorities should decide whether land is "contaminated land"
- explain how local authorities should go about implementing the regime
- explain how the regulator (i.e. the local authority or the Environment Agency in the case of "special sites") should ensure that remediation requirements are "reasonable"
- elaborate on specific aspects of the liability arrangements where more than one party is liable.

For planning purposes, the assessment of risks arising from contamination and remediation requirements should be considered on the basis of the current environmental setting, the current land use, and the circumstances of its proposed new use. The approach taken follows the risk-based tiered framework published by Defra and the Environment Agency in their guidance document "CLR 11 Model Procedures for the Management of Land Contamination" (Ref. 1).

The basis of CLR11 is the development of the conceptual site model and a CLEA (Contaminated Land Exposure Assessment) standard land use scenario (Ref.11) is usually applied to aid with the development of the linkages.

Fauna have not been considered as part of this assessment.

4.2 Preliminary Conceptual Site Model

Following the principles of CLR11 this assessment has been developed using desk study and site walkover information summarised in the preceding sections. The report therefore constitutes a Tier 1 risk assessment.

Based upon the available desk study and site walkover information and with reference to Environment Agency R&D Publication 66 (Ref. 2) a simplified preliminary conceptual site model has been developed. The aim is to identify potential sources of contamination, pathways and receptors that may exist and present a significant level of risk.

The scheme has been developed as commercial use. For the purposes of compiling the preliminary CSM the potential exposure pathways for human health have therefore been assumed to match the 'residential without plant uptake' Conceptual Exposure Model (CEM) as described in R&D Publication 66 (Ref.2).

An illustrative conceptual exposure model highlighting some of the pathways considered is provided below:

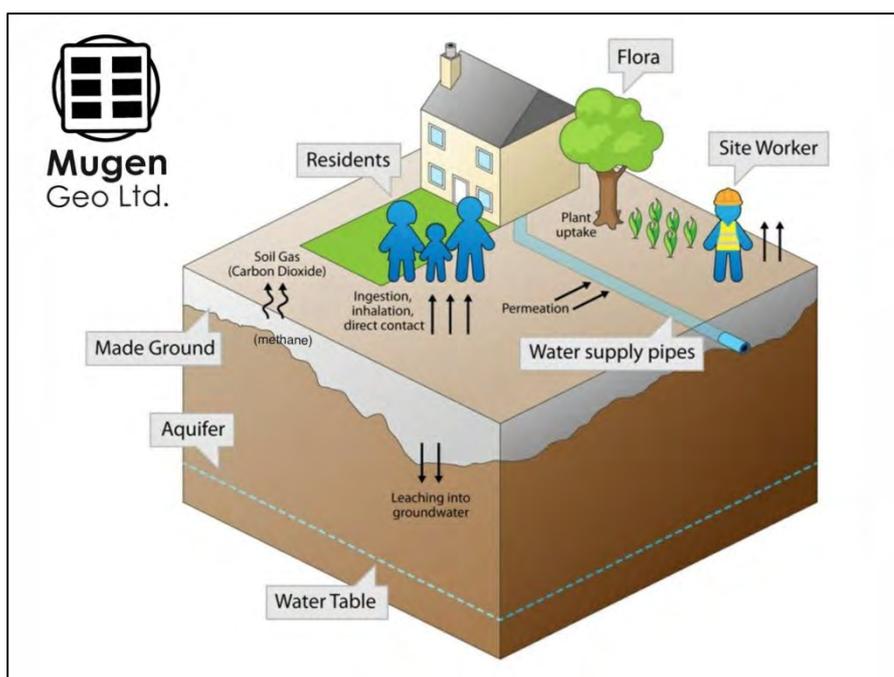


Figure 4 – Illustrative potential exposure pathways within the 'Conceptual Exposure model' (i.e. possible pollutant linkages)

4.3 Sources

Previous developments at the site and historic industrial uses on surrounding land are considered potential sources of contamination that could impact the site.

4.4 Pathways

The following potential exposure pathways have been identified for human health receptors (refer to figure 4 above):

- Ingestion of soil and soil derived dust
- Ingestion of household dust
- Consumption of home-grown vegetables
- Ingestion of soil attached to vegetables
- Dermal contact with soil
- Dermal contact with household dust
- Inhalation of vapours indoors
- Inhalation of vapours outdoors

The following potential pathways have been identified for controlled waters:

- Leaching/migration of contaminants through soil
- Migration of impacted perched water or groundwater or surface water runoff.

The following pathways have been identified for buildings:

- Migration of ground-borne gases through permeable ground
- Direct contact of buildings with contaminated soil or impacted groundwater
- Migration of ground-borne gases and groundwater along preferential pathways e.g. Service trenches and entries to new structures and services.

4.5 Receptors

The following receptors have been identified:

- Site end users – future residents and visitors (public open space and private gardens)
- Construction / site investigation workers
- Adjacent residents
- Maintenance workers
- Controlled waters (groundwater)
- Buildings on site, both existing and planned and new services.

Potential off-site receptors include:

- Controlled waters (surface water and groundwater)
- Construction workers and regular workers on adjacent sites

-
- Occupiers, visitors and users of adjacent sites

Table 4.5 on the following pages comprises the preliminary CSM and summarises the potential pollutant linkages based on information collated and interpreted in this Phase 1 assessment.

Source	Exposure Pathway	Receptor(s)	Probability	Consequence	Risk Level	Comments
Inorganic substances within Made Ground on site	Ingestion, inhalation or direct contact	Site Workers	Likely	Medium	Moderate	Site workers likely to be wearing appropriate PPE
	Ingestion, inhalation or direct contact	End users of the site	Likely	Medium	Moderate	End use will be for residential use.
	Inhalation of fugitive dust	Neighbours	Low likelihood	Medium	Low	Significant volumes of dust considered unlikely but demolition works should be conducted in a way that reduces dust production.
	Leaching through unsaturated zone	Groundwater and possible abstractors or aquatic ecosystems	Low likelihood	Medium	Low	Works unlikely to create new significant pathways for contaminant migration. Identified significant sources should be removed or remediated.
Organic substances in Made Ground on site associated including: Petroleum Hydrocarbons, Polynuclear Aromatic	Ingestion, inhalation or direct contact	Site Workers	Likely	Medium	Moderate	Site workers likely to be wearing appropriate PPE
	Ingestion, inhalation or direct contact	End users of the site	Likely	Medium	Moderate	End use will be for residential use.
	Inhalation of fugitive dust.	Neighbours	Low likelihood	Medium	Low	Significant volumes of dust considered unlikely but demolition works

Source	Exposure Pathway	Receptor(s)	Probability	Consequence	Risk Level	Comments
Hydrocarbons (PAH) VOC's & SVOC's						should be conducted in a way that reduces dust production.
	Leaching through unsaturated zone	Groundwater and possible abstractors or aquatic ecosystems	Low likelihood	Medium	Low	Works unlikely to create new significant pathways for contaminant migration. Identified significant sources should be removed or remediated.
Asbestos fibres from asbestos containing materials within Made Ground	Fugitive dust	Site Workers	Low likelihood	Medium	Low	Environmental testing is recommended.
		End users of the site	Low likelihood	Medium	Low	
		Neighbours	Low likelihood	Medium	Low	Environmental testing is recommended.
Ground Gas (methane & carbon Dioxide) from Made Ground/ organic sources	Migration through Soils or groundwater to indoor air	End users of new buildings (asphyxiation or explosion)	Low likelihood	Medium	Low	No significant sources identified.
		Users of off-site properties (asphyxiation or explosion)	Low likelihood	Severe	Low	
		New buildings (damage by explosion)	Low likelihood	Severe	Low	
		Neighbouring properties	Low likelihood	Severe	Low	No significant sources identified.

Source	Exposure Pathway	Receptor(s)	Probability	Consequence	Risk Level	Comments
		(damage by explosion)				

4.6 Qualitative Risk Assessment

The assessment of risk is defined in the Environment Agency & NHBC joint guidance publication R&D66 (Ref.2) as being a consideration of both:

- The likelihood of an event (probability) [taking account of both the presence of the hazard and receptor and the integrity of the pathway]; and
- The severity of the potential consequence [taking account of both the potential severity of the hazard and the sensitivity of the receptor].

4.6.1 Preliminary Assessment

With any site, the possibility of unidentified contamination being present cannot be entirely excluded. The historic use of the site with mills and other uses on surrounding land is considered as a potential source of contamination at the site. Sources on adjoining sites are considered unlikely to have significantly impacted the site.

Ground contamination remains a material planning consideration. Local planning authorities must take account of such issues in determining applications for planning permission. In addition, building work is regulated under the Building Regulations 1991. Schedule 1 (Ref. 8) requires 'precautions shall be taken to avoid danger to health and safety caused by substances found on, or in the ground covered by the building'.

Based on the past history of the site the probability of contamination being present sufficient to affect the identified existing receptors is considered to be a moderate risk. The current uses of the site were considered to have been a low risk of causing pollution or transferring contaminants beyond the confines of the site. This assessment is based upon a consideration of the geological setting, distance from surface water courses, and environmental fate & transport models that apply to the sources identified as summarised above.

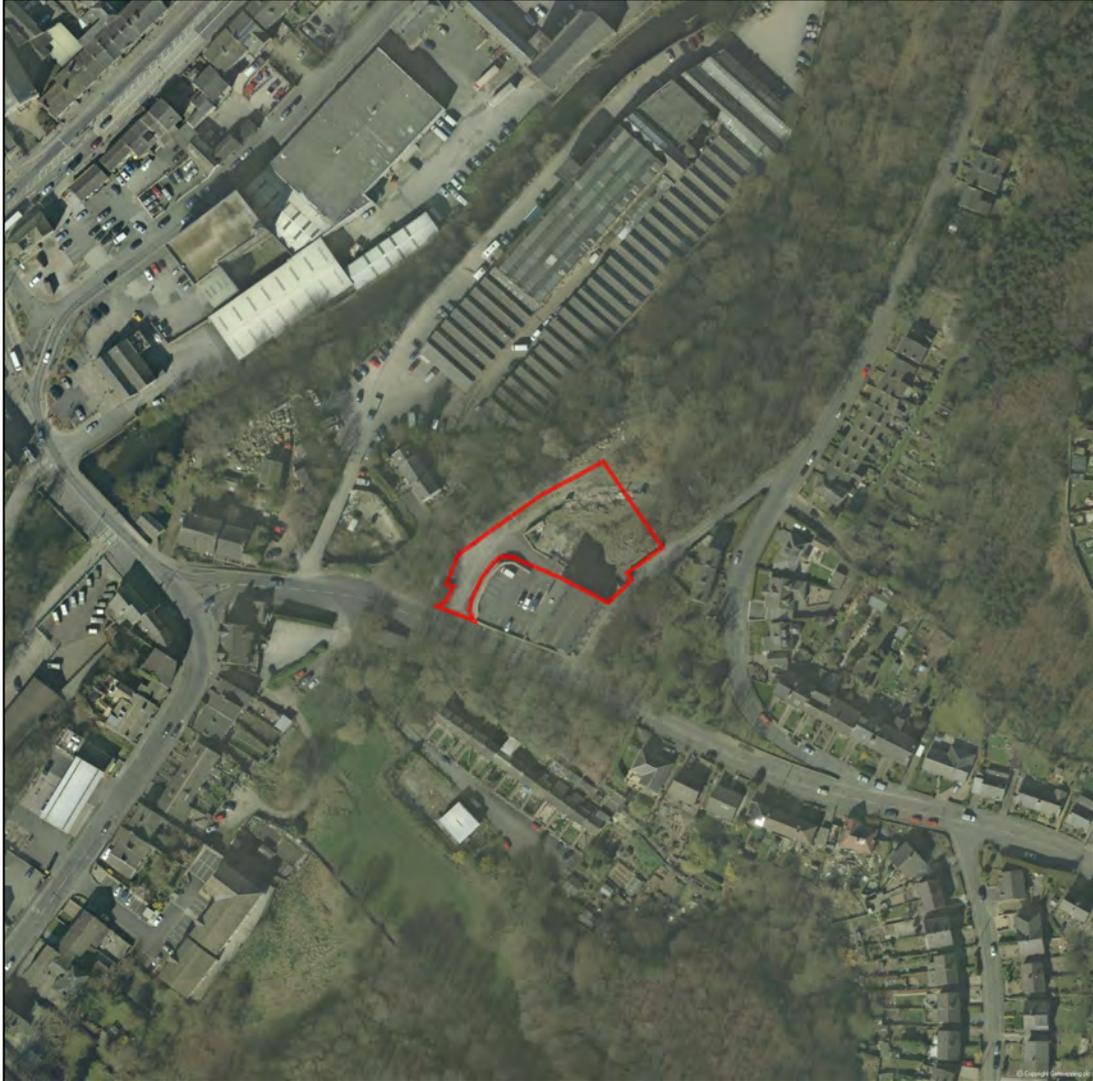
In this context, the significance of the conditions identified and the likelihood that risk and liability will be realised cannot be determined from the findings of the Phase I environmental review at this stage, and uncertainty remains with respect to determination of actual risks presented. A limited site investigation is recommended prior to development of the site.

5 References

1. Department of the Environment, Transport and the Regions and Environment Agency, Model Procedures for the Management of Land Contamination. Contaminated Land Report 11.
2. EA and NHBC 2000. Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66.
3. Department of the Environment, Transport and the Regions, Environment Agency and Institute of Environmental Health. Guidelines for Environmental Risk Assessment and Management. HMSO July 2000.
4. Construction Industry Research and Information Association (CIRIA). Contaminated Land Risk Assessment. A Guide to Good Practice. CIRIA C552 2001.
5. DoE, 1995 Industry Profiles.
6. EA, 2003b Consultation on Agency Policy: Building Development on or within 250m of a landfill site.
7. OPDM Planning Policy Statement 23: Planning and Pollution Control. Annex 2 Development on Land Affected by Contamination.
8. Approved Document C – Site Preparation and Resistance to Contaminants and Moisture (Relating to Building Regulations 2000 (SI 2000/2531).
9. BSI, 2011 Investigation of Potentially Contaminated Sites, Code of Practice, BS: 10175.
10. EA, 2001 Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination.
11. Environment Agency 2009: Updated technical background to the CLEA model Science report SC050021/SR3, Bristol, Environment Agency
12. Yorkshire & Humberside Pollution Advisory Council 2011. Development on Land Affected by Contamination - Technical Guidance for Developers Landowners & Consultants.
13. LQM 2007 Contaminated Land Management: Ready Reference 2007
14. A geological background for planning and development in the City of Bradford Metropolitan District. Vol. 1: A guide to the use of earth science information in planning and development. Technical Report WA/96/1 British Geological Survey.

APPENDIX A

SITE LOCATION PLANS



SITE LOCATION PLAN
[Not to scale]

↑
NORTH

APPENDIX B
ENVIRONMENTAL DATA

APPENDIX C

SITE PHOTOS



View north of site access from



View to the east towards residential apartments adjacent to the site



View north along western part of the site



View to north east from site towards Enoch Rd – note steep sloping bank and some fly-tipping



View of main development area in north of site



View to east from site towards Enoch Rd



View south across site towards Lockwood Scar



View from site towards residential apartments immediately south east of the site

