

HOLLYMOUNT FARM, BURY

PHASE 1: PRELIMINARY RISK ASSESSMENT

Job Number: LKC 22 1142

Date: April 2022

Client: Keystone Projects (Hawkshaw) Ltd



INCREASING LAND VALUE

LK
GROUP

INCREASING LAND VALUE



LK Consult			
Document Verification			
Site Address	Hollymount Farm, Hollymount Lane, Tottington, Bury, BL8 4HP		
Report Title	Phase 1: Preliminary Risk Assessment		
Job Number	LKC 22 1142	Document Ref.	CL-602-LKC 22 1142-01
Date Issued	8 th April 2022	Report Version	R0
Prepared By	Joe Walker	Reviewed By	Rachel Peart

Revision Record			
Revision No.	Date	Nature of Revision	Approved By

DISCLAIMER

This report has been prepared by LK Consult (LKC) who have exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant, experienced in preparing reports of a similar scope.

However, to the extent that the report is based or relies upon information contained in records, reports or other materials provided to LKC, which have not been independently produced or verified, LKC gives no warranty, representation or assurance as to the accuracy or completeness of such information.

This report is prepared solely for the benefit of Keystone Projects (Hawkshaw) Ltd. It may not be relied upon by, or submitted to a third party for their reliance for the purposes of valuation, mortgage, insurance and regulatory approval, until all invoices have been settled in full.

Those using this information in subsequent assessments or evaluations do so at their own risk.

Contents

1	Introduction.....	1
2	Historical Review	2
3	Environmental Setting	4
4	Site Reconnaissance	6
5	Preliminary Conceptual Model.....	9
5.1	Introduction.....	9
5.2	Potential Contaminants.....	9
5.3	Potential Receptors.....	10
5.4	Potential Pathways	10
5.5	Preliminary Contamination Conceptual Model.....	11
6	Preliminary Geotechnical Risk Assessment.....	13
7	Summary Conclusions and Recommendations	14
7.1	Summary Conclusions	14
7.2	Recommendations	16

Figures

- Figure 1: Site Location and Boundary Plan
Figure 2: Proposed Development Plan

Appendices

- Appendix A: Historical Maps
Appendix B: Envirocheck Report
Appendix C: Zetica UXO Unexploded Bomb Risk Map
Appendix D: Risk Evaluation

1 Introduction

LK Consult Ltd (LKC) has been commissioned to carry out a Phase 1 Preliminary Risk Assessment (PRA) for Hollymount Farm, Bury.

In accordance with current guidance (including LCRM¹ and the National Planning Policy Framework (NPPF)²), the PRA will include a site reconnaissance, site history, geology, hydrogeology, hydrology, mineral search and a landfill search. Information gathered from the desk study and site reconnaissance will be used to develop a contamination conceptual model for the site.

In addition, the information gathered will be used to identify potential geotechnical constraints associated with the redevelopment of the site.

Based on the findings of this report, an appropriate site investigation can be derived, if required.

Site details are provided in Table 1-1. Figure 1 shows the site location and boundary. Figure 2 shows the proposed development plan.

Site Location	Southwest of Hollymount Lane, located in Greenmount, Bury. Centred at approximate National Grid Reference 377280E 414000N
Approximate Area	5,500m ² .
Topography	140 metres Above Ordnance Datum (AOD). Site slopes towards to the southwest.
Current Site Use	Former farm with outbuildings in a predominantly hardstood area.
Purpose of Report	Pre-planning.
Proposed Development	Residential housing with gardens / soft landscaping. 6no. dwellings to be built on former farm.

Table 1-1: Summary of site details

¹ Land Contamination Risk Management (LCRM) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

² "National Planning Policy Framework." The Ministry of Housing, Communities and Local Government. Published March 2012, Updated July 2021.

2 Historical Review

In compiling the site history, LKC consulted Envirocheck historical mapping (Appendix A) and other public domain aerial photography.

Table 2-1 summarises features on site. Table 2-2 summarises potentially contaminative land uses within approximately 50m and potentially infilled features within approximate 250m.

Site Features	Location on Site	Dates Present		Comments
		From	To	
Field boundary	Centre of site N-S	1850	1992	No longer present by 1992 mapping.
Lower Buckley Fold (Farm)	All of site	1850	Present	Several buildings present in the centre of the site. Not labelled as Hollymount Farm until 1964. Various changes in the mapping of the buildings over time. Additional building built to the south in 1994. Building added to the west on 2006 mapping, and another in 2021 mapping.
Electricity Pylon	SE	1960	1999	Overhead electricity cable running NWW-SEE. No longer present by 2000 aerial photography, replacement built further south, off site.

Table 2-1: Summary of site features. Dates based on available historical map editions.

Surrounding Area Features	Distance (m)	Direction	Dates Present		Comments
			From	To	
Watercourses	83	E + S	1850	Present	To the south and the east of the site. Flowing generally in a SE direction.
Watercourse	105	N	1910	Present	Small stream with issues to the north and a sink to the south. Flowing south.
Watercourse	137	N	1910	Present	Small stream with issues to the northwest and a sink to the southeast. Flowing southeast.
Filter and sewage beds	199	W	1910	1911	No longer present by 1930 mapping.
Reservoir	224	SW	1850	1964	Mapped as marshy area from 1976 mapping with an occasional pond on future mapping. From 2000 aerial photography to present, the area is forested, possibly infilled.
Burial Ground	236	NW	1910	Present	

Table 2-2: Summary of potentially contaminative features within 50m and potentially infilled features with 250m. Dates are based on available historical map editions.

Plate 2-1 shows the features noted in Table 2-1 and 2-2, on the current 1:10,000 raster map.

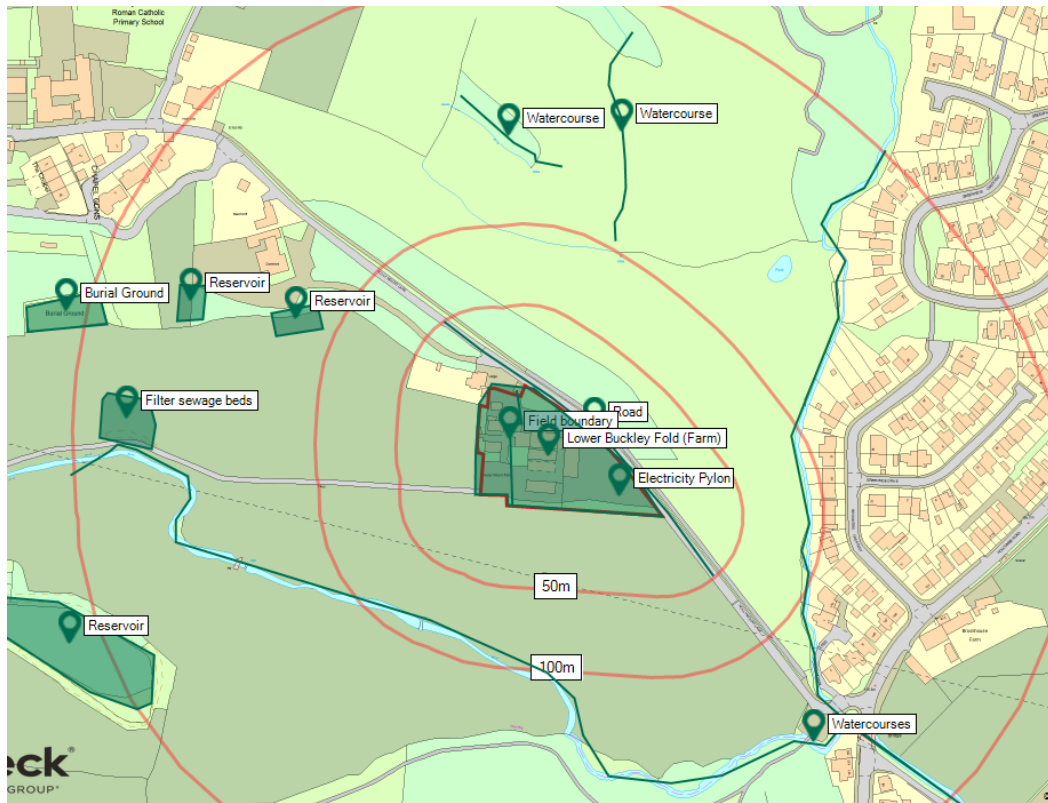


Plate 2-1: Historical features.

3 Environmental Setting

A summary of environmental settings is presented in Table 3-1, based on a review of available environmental data.

Categories ^(data sources)		Details
Geology ¹	Artificial	- No BGS recorded artificial.
	Superficial	- Till (diamicton) in the NW of the site. - River terrace (sand and gravel) deposits in the SE of the site.
	Bedrock	- Pennine Lower Coal Measures Formation (mudstone, siltstone, and sandstone).
	BGS Logs (<50m)	- None.
Hydro-geology ¹	Aquifer Designation	- Superficial
		- Bedrock
	Source Protection Zone (SPZ)	- Site not within an SPZ.
	Groundwater Abstractions (100m)	- None.
Hydrology ¹	Surface Water Courses (100m)	- Un-named brook, 85m SW.
	Flooding risk	- Flood Zone 1.
	Surface Water Abstractions (100m)	- None.
	Discharge Consents (onsite)	- None.
	Pollution Incidents (onsite)	- None.
Minerals & Mining ^{1,2}	Coal Mining	- Within a Coal Reporting Area. - Not within a Development High Risk Area.
	Surface Mineral Extractions (250m)	- None.
	Cheshire Brine Compensation District	- Not within Compensation District. - Not within Consultation Area.
	Non-Coal Mining Area	- No Hazard.
Ground Stability ¹	Collapsible Ground	- Very low hazard.
	Compressible Ground	- No hazard.
	Ground Dissolution	- No hazard.
	Landslide	- Low to very low hazard.
	Running Sand	- Very low hazard.
	Shrinking / Swelling Clay	- Very low hazard.

Table 3-1: Summary of the environmental setting.

Notes: Distance in brackets is the distance from site that features are included. Where no distance given, features relate to on site only.

Data Sources:

1 Envirocheck Report (Appendix A & B)

2 The Coal Authority Web Mapping Services (WMS) /

Interactive Map Viewer <http://coal.decc.gov.uk/en/coal/cms/publications/data/map/map.aspx>

Categories ^(data sources)		Details
Landfill Sites (250m) ¹	Known / Registered	- None.
	Potentially Infilled Land (non-water and water), based on Envirocheck Report	- 1no. features: 226m, SW.
	Potentially infilled sites, based on LKC historical review	- 3no. features: See Table 2-2.
Radon Potential ¹		- <1% of homes above Action Level. No protective measures are necessary in the construction of new dwellings or extensions.
Designated Sites (50m) ¹		- Adopted Green Belt on site.
Contemporary Trade Directory (50m) ¹		- None
Fuel Station Entries (50m) ¹		- None.
Unexploded Ordnance Risk (UXO) – Zetica Risk Map ³		- Bomb Risk: Low. - Strategic Targets: None identified within 100m

Table 3-1 (continued): Summary of the environmental setting.

Notes: Distance in brackets is the distance from site that features are included. Where no distance given, features relate to on site only.

Data Sources:

1 Envirocheck Report (Appendix A & B).

3 Zetica UXO Unexploded Bomb Risk Map (Appendix C).

4 Site Reconnaissance

A site reconnaissance was carried out on 08 March 2022.

Relevant features identified on site are summarised below:

- » The site is currently used for residential purpose, particularly in the west. There is also storage of materials and farm machinery across the majority of the site, with storage cabins in the east of the site.
- » Several buildings located on site particularly in the central and western areas, including a newly built stone bungalow, timber and corrugated metal barns and a canopy building. Possible asbestos cement sheeting was noted on these buildings. Drips of roofing pitch were noted under the roof canopies and drainpipes. The presence of cellars on site is unknown.
- » A former milk storage facility was also present in the north of the site. Spillages were observed inside the building and outside the building, of an unknown substance, draining into the adjacent drain.
- » The groundcover consists of compacted gravel in the east. Across the remainder of the site, there is a mix of tarmacadam (good to poor condition), soft landscaping/grass, and paved areas. The grasses area is located in the northwest and contains some mature trees and shrubs which are adjacent to the residential property.
- » Oil tank present on site, but anecdotal evidence suggested it was there only for one week. No associated bund or oil spills present. No underground tanks noted on site. Empty IBC also noted on the east of the site.
- » Several services were found on site including electricity and possibly BT. An electricity box is present in the west of the site. No evidence of gas services was found on site. Surface water and foul drainage was also noted.

The surrounding area comprises a road to the north, an old residential property to the northwest, and greenfield areas to the south and east.

Relevant photographs are provided in Plate 4-2.



Plate 4-2: Site photographs.



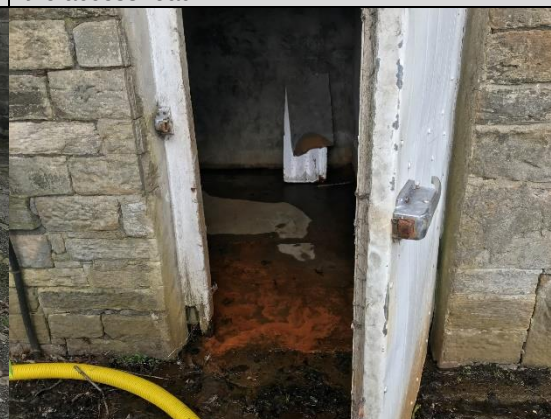
Photograph 3: Empty IBC located in the east by the access road.



Photograph 4: Stone building located south off the access road.



Photograph 5: Drainage gullies within the access road.



Photograph 6: Former milk storage building in the north. Spillage of orange substance on the floor.



Photograph 7: Bungalow located in the west and a gate to fields in the south.



Photograph 8: Manhole cover located in the southwest.

Plate 4-2 (continued): Site photographs.

	
Photograph 9: Machinery and Oil tank stored under canopy in the centre of the site.	Photograph 10: Storage area in the centre of the site. Drips of roofing pitch observed.
	
Photograph 11: View of the site from the south.	Photograph 12: Former barn in the centre south.

Plate 4-2 (continued): Site photographs.

Relevant features are also shown on Plate 4-3.



Plate 4-3: Plan showing relevant site walkover features.

5 Preliminary Conceptual Model

5.1 Introduction

The aim of the conceptual model is to provide a preliminary assessment of the likelihood of a pollutant linkage for each potential combination of contaminant, pathway and receptor. A conceptual model can be used to make an informed decision on the contamination risks associated with the site and whether further site investigation work is required.

The Sections below are therefore divided into potential contaminant, potential pathway and potential receptor as described in LCRM³, on the premise that, if there is no pollutant linkage, then there will be no risk to the receptor. The final Section provides an assessment of the potential pollutant linkages that may still be present on the site if redevelopment were to occur.

5.2 Potential Contaminants

Potential viable contamination sources are detailed in Table 5-1. These are split into onsite sources, offsite sources and underlying geology.

Potential Source	Contaminants
On Site	
Shallow Made Ground below some or all of site (e.g. site levelling)	- Assuming predominantly reworked natural soils with possible demolition rubble, ash and clinker: Asbestos, heavy metals, sulphates, PAHs⁴. - Not expected to be a significant source of gas given anticipated depth and nature of Made Ground.
Agricultural land (including farmyard and barns)	- Use and maintenance of machinery: Fuels, oils. - Oil tank identified in site reconnaissance: Petroleum hydrocarbons. - Storage / use of chemicals including pesticides, insecticides and herbicides: organophosphates, organochlorides, chlorophenols, aldrin, dieldrin, atrazine and DDT. - Old buildings: Asbestos Containing Material (ACM), roof pitch (coal tar).
Demolished buildings	- Possible demolished buildings from changing farmyard in site history. Asbestos Containing Material (ACM).
Surrounding Area	
Landfills / offsite potentially infilled features within 250m	- Given size, distance and age of features, there is not considered to be a significant source of hazardous gas.

Table 5-1: Potential contamination sources.

³ Land Contamination Risk Management (LCRM) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

⁴ Defra (2002). "Potential Contaminants for the Assessment of Land". R&D Publication CLR 8.

Underlying Geology	
Underlying Pennine Lower Coal Measures	- Ground Gas (principally carbon dioxide and methane).
Radon Affected Area	- <1% of homes above Action Level. No protective measures are necessary in the construction of new dwellings or extensions. - No further consideration required.
Superficial / Bedrock	- No significant contamination sources identified.

Table 5-1 (continued): Potential contamination sources.

5.3 Potential Receptors

Potential receptors are detailed in Table 5-2.

Receptors	
Human Health	- Future site users (including residents, visitors and site workers). - Offsite land users.
Controlled Waters	- Brook 85m southwest. - Secondary Undifferentiated and Secondary A Superficial Aquifers. - Secondary A Bedrock Aquifer.
Buildings.	
Potable water pipes.	

Table 5-2: Potential receptors.

5.4 Potential Pathways

Potential pathways are detailed in Table 5-3.

Pathways		
Soil	Human Health ⁵ (residential land use: houses with private gardens)	- Ingestion of soil. - Ingestion of soil-derived indoor dust. - Ingestion of contaminated vegetables. - Ingestion of soil attached to vegetables. - Dermal contact with soil. - Dermal contact with soil-derived indoor dust. - Inhalation of soil-derived outdoor dust. - Inhalation of soil-derived indoor dust. - Inhalation of vapours outside. - Inhalation of vapours inside.
		- Windblown dust and fibres to adjacent receptors.
		- Direct contact with receptors (services).
Water		- Surface run-off over impermeable surface. - Site is partly flat and grassed; therefore, surface run-off will be limited slightly. - Infiltration into the ground, through potentially contaminated material (contamination possibly going into solution). - Site is predominantly hardstood; therefore, infiltration is likely to be limited.
Water and Gas		- Migration through potentially permeable strata and preferential pathways. - Superficial Till likely to be low permeability. - Superficial River Terrace Deposits (sand and gravel) is likely to be variably permeable. - Bedrock (mudstone, siltstone, sandstone) likely to be variably permeable. - Preferential pathways: services.
Gas		- Migration into buildings (e.g. via services) and accumulation of gases in confined spaces (potentially causing explosion if methane is present).

Table 5-3: Potential pathways.

⁵ EA (2008). "Updated Technical Background to the CLEA Model". Science Report – SC050021/SR3.

5.5 Preliminary Contamination Conceptual Model

The Preliminary Contamination Conceptual Model is illustrated in Table 5-4 and has identified five generic potential pollutant linkages.

Each linkage is described along with an assessment of the risk based upon guidance on probabilities and consequences outlined in CIRIA C552⁶.

In order to assess the potential risk for each pollutant linkage, an assessment of the magnitude of the potential consequence (severity) of the risk occurring and the magnitude of the probability (likelihood) of the risk occurring has been considered and classified. This is based on the guidance provided in CIRIA C552 and further details including a risk matrix is provided in Appendix D.

Where LKC identified a low to very low risk, targeted or low density intrusive investigation work, a watching brief (during construction work) or no investigation work will be recommended. This will be dependent on the nature of the site and the proposed development.

Where the risk falls into the moderate/low risk, LKC will undertake an assessment to establish what category the pollutant linkage will fall into (i.e. moderate or low risk will be chosen).

Where LKC identifies a moderate or higher risk, intrusive investigation work or precautionary remedial measures will be recommended.

Due to the minor consequence associated with the phytotoxic effect to flora (i.e. loss of plants in a landscaping scheme), the overall risk for the majority of sites will be very low to low. Where soils contain significant concentrations of heavy metals, in general there will other pollutant linkages (i.e. the risk to human health) that will trigger the requirement for remediation (e.g. a clean environmental cover system). As such the risk to flora associated with phytotoxic contaminants will not be considered further.

The risk to buildings associated with elevated sulphate will be considered as part of the geotechnical assessment and will not be included in the contamination risk assessment.

It should be noted that there may be risk from short term exposure from contaminated soil to site workers. The Preliminary Contamination Conceptual Model deals with long term exposure to key receptors. Acute risks can be easily mitigated by good environmental management of the site during site works. Standard health and safety precautions (as per HSE guidance⁷) should be adopted by all workers involved with site enabling and construction works. Therefore, this receptor is not considered in the contamination conceptual model.

⁶ CIRIA (2001). "Contaminated Land Risk Assessment: A Guide to Good Practice". C552.

⁷ HSE (1991). "Protection of Workers and the General Public During Development of Contaminated Land". London HMSO.

PL	Pathway	Receptor	Contaminants of Concern (CoC)	Probability	Consequence	Risk	Recommendations
1	- Dermal contact. - Inhalation of soil, fibres and dust. - Ingestion of soils, dust, vegetables, soil attached to vegetables. - Windblown dust.	- Future site users. - Offsite receptors.	- ACM. - Heavy metals. - PAHs (including coal tar). - Petroleum hydrocarbons. - Other inorganic and organic contaminants. - Pesticides, insecticides, herbicides.	Low Likelihood (given site history, site conditions and proposed end use)	Medium	Moderate / Low (moderate assumed until ground conditions confirmed)	Intrusive investigation required. Soil analysis of CoC.
2	- Inhalation of vapours. - Migration via permeable strata and preferential pathways.	- Future site users. - Offsite receptors.	- Volatile contaminants (TPHCWG), coal tar.	Low Likelihood (given site history, site conditions and proposed end use)	Medium	Moderate / Low (low risk assumed given anticipated ground conditions)	Intrusive investigation required, to include PID testing. Soil analysis of CoC, subject to ground conditions encountered and PID testing.
3	- Inhalation of gas. - Migration via permeable strata and preferential pathways. - Explosion in confined spaces. - Exposure to radon.	- Future site users. - Buildings. - Offsite land users.	- Ground / hazardous gas (carbon dioxide, methane).	Unlikely (given limited gas source and unknown pathway)	Severe	Moderate / Low (moderate assumed until ground conditions confirmed)	Intrusive investigation to confirm ground conditions. If significant gas source and pathway identified, gas monitoring or gas protection measures required.
4	- Surface run-off. - Migration via permeable strata and preferential pathways. - Perched waters migration.	- Groundwater (Secondary Undifferentiated and Secondary A Superficial Aquifers. Secondary A Bedrock Aquifer). - Surface water (Unnamed brook).	- Mobile contaminants such as metals, PAHs, hydrocarbons, volatile compounds.	Low Likelihood (only minimal mobile contamination anticipated with limited pathway)	Medium	Moderate / Low (moderate assumed until ground conditions confirmed)	Low density intrusive investigation required. Groundwater sampling, subject to ground conditions encountered. Analysis of CoC. Surface water sampling if elevated CoCs identified in groundwater.
5	- Ingestion of tainted water supply.	- Future site users. - Water pipes.	- Organic contaminants such as petroleum hydrocarbons.	Low Likelihood (given site history, site conditions and made ground not expected at pipeline depth)	Medium	Moderate / Low (low risk assumed given anticipated limited made ground and contamination)	Low density intrusive investigation required. Soil analysis of CoC, subject to ground conditions encountered.

Table 5-4: Preliminary Contamination Conceptual Model.

Notes: PL = Pollutant Linkage. Contaminant of Concern (CoC) - See Table 5-1 for contamination sources. Site conditions based on observations during site reconnaissance.

6 Preliminary Geotechnical Risk Assessment

Table 6-1 summarises the possible geotechnical constraints of the site, based on the site history, environmental settings and site reconnaissance. Investigation work will be required to confirm the risks and provide a detailed geotechnical assessment and foundation design.

Coal Mining	Site is not within a Development High Risk Area. No further assessment required.
Slope Stability	Site slopes southwest. No significant slope stability risk anticipated. No further assessment required.
Envirocheck Ground Stability Hazards	No to low hazard identified. No further action required.
Made Ground	Unknown depth and constituent of made ground across the site. Possible in-ground structures from previous farmyard buildings.
Field boundaries	Possible former hedges / trees / ditch resulting in increased likelihood of roots, organic material, shallow made ground.
Superficial	Unknown strength of soils for foundation design. Clay and sand anticipated below the site. Strata may be variable giving differential settlement.
Bedrock	Unknown depth to bedrock.
Groundwater	Unknown depth and variability of groundwater. Shallow / fluctuating groundwater can affect the strength of the soil, particularly in granular ground. Shallow groundwater can also affect construction works.
Plasticity	Plasticity of clay deposits should be confirmed, particularly where trees are present or proposed, to identify the shrink / swell risk.
Sulphate	Unknown sulphate content of the made ground and natural.
Road / Pavement Design	Unknown CBR values for footpath and road design.

Table 6-1: Summary of geotechnical constraints.

7 Summary Conclusions and Recommendations

7.1 Summary Conclusions

Table 7-1 summarises the site details, historical review, environmental settings and site reconnaissance.

Current Site Use	Farm with outbuildings in a predominantly hardstood area.
Proposed Development	Residential housing with gardens / soft landscaping. 6no. dwellings to be built on the farm's hard standing footprint.
Main Historical Features	Onsite: Farmstead, Field boundary, Electricity Pylon. Surrounding Area: Watercourses, Reservoir, Filter and sewage beds, Burial ground.
Geology / Hydrogeology	Artificial: No BGS recorded artificial. Superficial: Secondary Undifferentiated Aquifer in the northwest in Till (diamicton). Secondary A Aquifer in the southeast in River Terrace deposits (sand and gravel). Bedrock: Pennine Lower Coal Measures. Secondary A Aquifer.
Landfills / Infilled Ground	No recorded landfills. Potentially infilled ground identified.
Site Walkover	Residential land use with several barns and farm buildings present on site. Site slopes to the southwest with a groundcover of mostly hard stood but some grassed areas present. Temporary oil tank on site and empty IBC also noted in the east. Services present on site. Access possible in most areas with drilling rig and excavator.

Table 7-1: Summary of site details, historical review, environmental settings and site reconnaissance.

A preliminary contamination conceptual model has been produced by LKC, which is summarised in Table 7-2.

Pollutant Linkage		Risk	Recommendations
PL1: Contaminants posing a risk to future site users via dermal contact, ingestion and inhalation (of soil, dust, fibres and vegetables).	ACM, heavy metals, PAHs (inc. coal tar), Petroleum hydrocarbons, Other inorganic and organic contaminants, Pesticides, herbicides, insecticides.	Moderate / Low	Intrusive investigation required. Soil analysis of CoC.
PL2: Volatile contaminants posing a risk to future site users via the inhalation of vapours.		Moderate / Low	Low density intrusive investigation required, to include PID testing. Soil analysis of CoC, subject to ground conditions encountered and PID testing.
PL3: Gas (carbon dioxide and methane) posing a risk to buildings and future site users via the migration of gas into building causing explosion and asphyxiation.		Moderate / Low	Intrusive investigation to confirm ground conditions. If significant gas source and pathway identified, gas monitoring or gas protection measures required.

Table 7-2: Summary risk table.

Where moderate / low risk had been identified, the assumed risk is shown in bold.

Pollutant Linkage	Risk	Recommendations
PL4: Mobile contamination posing a risk to controlled waters via the migration through permeable strata.	Moderate / Low	Low density intrusive investigation required. Groundwater sampling, subject to ground conditions encountered. Analysis of CoC. Surface water sampling if elevated CoCs identified in groundwater.
PL5: Organic contaminants posing a risk to water pipes.	Moderate / Low	Low density intrusive investigation required. Soil analysis of CoC, subject to ground conditions encountered.

Table 7-2 (continued): Summary risk table.

Where moderate / low risk had been identified, the assumed risk is shown in bold.

A preliminary geotechnical assessment has been carried out by LKC. Table 7-3 summarises the geotechnical constraints.

Coal Mining	Site is not within a Development High Risk Area. No further assessment required.
Slope Stability	No significant slope stability risk anticipated. No further assessment required.
Made Ground	Unknown depth and constituent of made ground across the site.
Superficial	Unknown strength of soils for foundation design.
Bedrock	Unknown depth to bedrock below site.
Groundwater	Unknown depth and variability of groundwater.
Plasticity	Plasticity of clay deposits should be confirmed.
Sulphate	Unknown sulphate content of the made ground and natural.
Road / Pavement Design	Unknown CBR values for footpath and road design should be calculated.

Table 7-3: Summary of geotechnical constraints.

7.2 Recommendations

Recommendations are provided in Table 7-4.

Contamination Status	There is sufficient information on the potential contaminative status of the site to allow conditional approval of a planning application, based on the proposed end use detailed in the PRA.
Further Assessment Recommendations	Phase 2 intrusive investigation required. Phase 2 investigation to be carried out in line with current guidance, including BS10175 ⁸ , BS5930 ⁹ CIRIA C665 ¹⁰ , RB17 ¹¹ and BS8485 ¹² . Either 'exploratory investigation': 1 sample per 25-50m square centres. Or 'detailed investigation': 1 sample per 10-25m square centres. Plus targeted investigation locations in areas of concern (contamination and geotechnical). To be agreed with the local authority.
Type Of Investigation Work	Boreholes and / or trial pits.
PL 1, 2, 5	Intrusive investigation work recommended to confirm ground conditions across the site. Testing of contaminants of concern based on preliminary conceptual model and field observations (PID tests and visual / olfactory evidence).
PL 3	Intrusive investigation to confirm ground conditions. If significant gas source and pathway identified, gas monitoring or gas protection measures required. Gas monitoring: monitoring wells to be installed in boreholes, monitoring frequency and period subject to anticipated risk. Precautionary gas protection measures: type of measures to be determined once ground conditions established.
PL 4	Groundwater sampling, subject to ground conditions encountered. Groundwater samples to be collected from monitoring wells and tested for contaminants of concern based on preliminary conceptual model and ground conditions encountered.
Reporting	Information from the above can be used to carry out a contamination and geotechnical assessment and provide a remediation strategy for the site.

Table 7-4: Recommendations.

Further Considerations are summarised in Table 7-5.

Asbestos	Possible asbestos was identified externally on the existing buildings, given the age, there may be areas inside that have Asbestos Containing Materials (ACMs). Therefore, we would advise that a Pre-Demolition and Major Refurbishment Asbestos Survey is undertaken prior to demolition by a professional contractor. The LK Group have a designated Asbestos Department who can advise on the appropriate steps to take in order to have the building suitably surveyed.
-----------------	---

Table 7-5: Further considerations.

⁸ British Standard (2017). "Investigation of Potentially Contaminated Sites – Code of Practice". BS10175:2017.

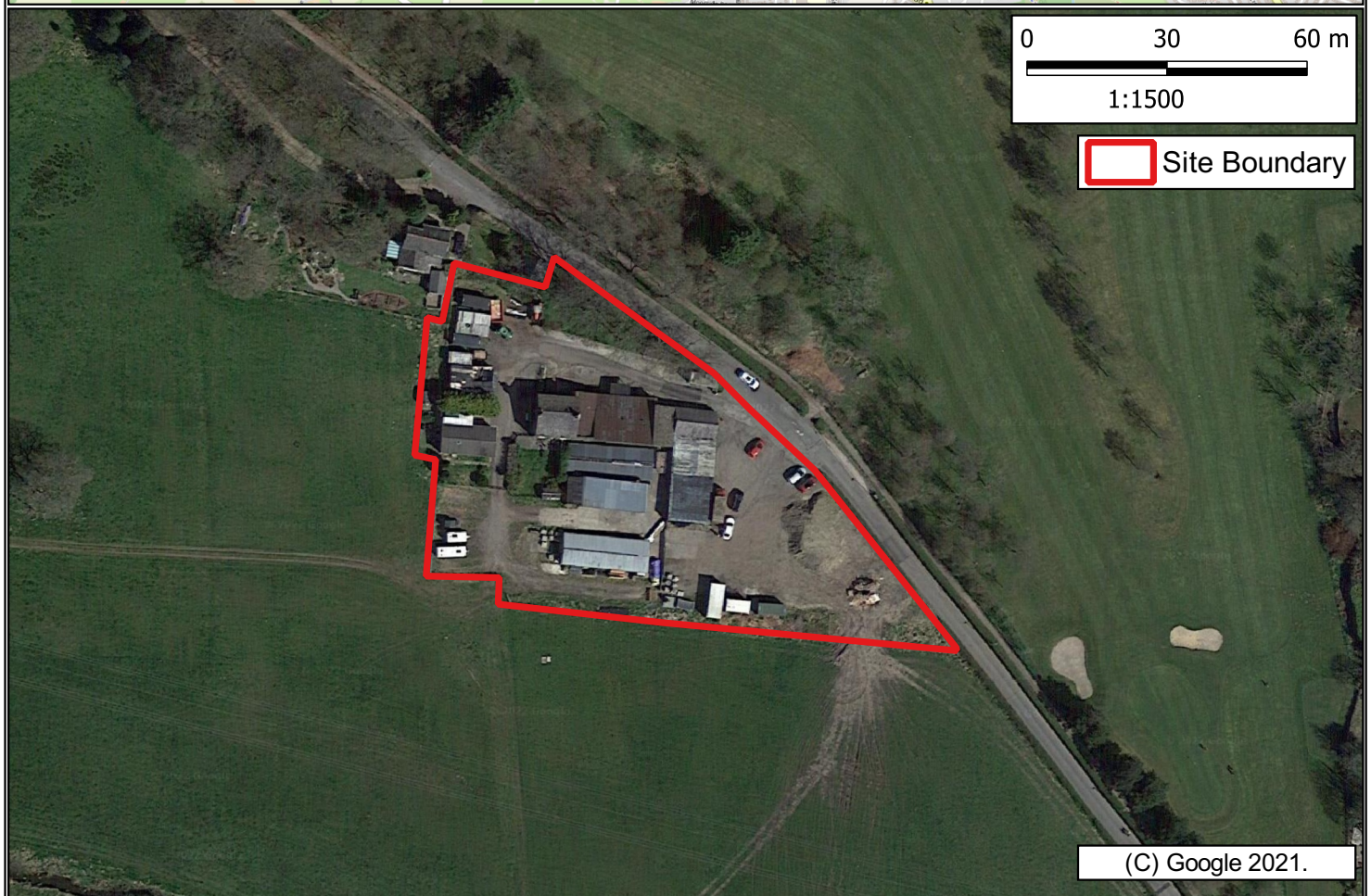
⁹ British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.

¹⁰ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings". CIRIA C665.

¹¹ CL:AIRE Research Bulletin RB17 (November 2012) "A Pragmatic Approach to Ground Gas Risk Assessment".

¹² BSI (2015). "Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings". BS8485:2015.

Figures



Client: Keystone Projects (Hawkshaw) Ltd				Title: Site Location & Boundary Plan			
Site: Hollymount Farm, Bury							
Job No.: LKC 22 1142	Drawn By: JW	Checked By: EK	Drawn: April 2022	Scale (see scale bar): 1:25,000 & 1:1,500 @ A4		Figure: 1	