

8 POLYGON ROAD CRUMPSALL

PHASE 1: PRELIMINARY RISK ASSESSMENT

Job Number: LKC 21 1206

Date: July 2021

Client: Asjed Qayyum



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1 Introduction

LK Consult Ltd (LKC) has been retained to carry out a Phase 1 Preliminary Risk Assessment (PRA) for 8 Polygon Road, Crumpsall.

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	Site to the southeast of the junction of Polygon Road and Crumpsall Lane, Crumpsall, Manchester. National Grid Reference 383768E 402389N.
Approximate Area	1750m ² .
Topography	80 metres above ordnance datum (AOD). Site is approximately level.
Current Site Use	Former nursing home building with associated grounds.
Purpose of Report	Planning.
Proposed Development	Residential apartments with soft landscaping. Refurbishment of the existing building with associated roof dormer addition. Demolition of part 2 storey structure and erection of 4 storey building to be used as residential units class (C3a) with associated amenities and car park.

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. February 2019.

2 Historical Review

In compiling the site history, LKC consulted public domain maps / 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	
Undeveloped Land	Whole	1848	1848	Developed by 1893 mapping.
House and Grounds	Whole	1890	2021	Main Building in the centre and east with several outbuildings (including glass houses) in the south. Associated gardens / ground across the remainder of the site. Various building extensions. Named as 'Northwood House' on 1890 mapping (town plan). Named as 'Westwood' from 1952 mapping.

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	
Crumpsall Lane	Adj.	N	1848	2021	
Polygon Road	Adj.	W	1848	2021	
Pond	110m	NW	1848	1848	No longer present on 1893 mapping.
Pond	140m	SW	1848	1848	No longer present on 1893 mapping.
Residential	Majority of Surrounding Area		1848	1849	Residential properties and associated gardens.

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

3 Environmental Setting

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

Categories		Details
Geology ³	Artificial	- No BGS recorded artificial.
	Superficial	- Till (diamicton).
	Bedrock	- Geological fault running through the site NW-SE with downthrow to the NE. - NE of the fault: Sherwood Sandstone Group. - SW of the fault: Collyhurst Sandstone Formation.
	BGS Logs	- None within 100m.
Hydrogeology / Aquifer Designation ⁴		- Principal Aquifer (bedrock). - Unproductive Aquifer (superficial). - Not within a Source Protection Zone.
Hydrology ⁵	Nearest Surface Water	- None within 100m.
	Flooding	- Flood Zone 1.
Coal Mining ⁶		- Within a Coal Reporting Area. - Not within a Development High Risk Area.
Landfill Sites	Known ⁷	- No recorded historic landfills within 250m.
	Potential	- 3no. potentially infilled ponds within 250m (100-190m distance, infilled by 1909).
Radon ⁸		- 1-3% of homes above Action Level. No protective measures are necessary in the construction of new dwellings or extensions.
Unexploded Bomb Risk (UXO)		- Zetica Risk Map ⁹ - Moderate Risk. - Zetica Pre-Desk Study Assessment (Appendix A). A detailed desk study, whilst always prudent, is not considered essential in this instance.

Table 3-1: Summary of environmental setting.

³ <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/> and <https://webapps.bgs.ac.uk/data/maps/maps.cfc?method=listResults&mapName=&series=E50k&scale=&pageSize=100&start=0>

⁴ <https://magic.defra.gov.uk/MagicMap.aspx>

⁵ <https://flood-map-for-planning.service.gov.uk/>

⁶ <http://mapapps2.bgs.ac.uk/coalauthority/home.html>

⁷ <https://environment.data.gov.uk/DefraDataDownload/?mapService=EA/HistoricLandfill&Mode=spatial>

⁸ <https://www.ukradon.org/information/ukmaps>

⁹ <https://zeticauxo.com/downloads-and-resources/risk-maps/>

4 Site Reconnaissance

A site reconnaissance was carried out on 02 July 2021. Hand dug trial holes were undertaken in accessible areas to confirm the shallow ground conditions.

Relevant features identified on site are summarised below:

- The site is accessed off Polygon Road to the west of the site.
- The site is bound to the west by Polygon Road, to the north by Crumpsall Lane, to the east by a derelict house and to the south by apartments.
- The site consists of the derelict Westwood Nursing Home, a brick building with recent extensions to the west and to the south. The ground to the south of the site consists of tarmacadam (former car parking area). The ground to the north is a former garden (grassed).
- On the northern side of the nursing home is a door leading to a basement area. Wood, boards and tyres were noted in this area.
- The building does not show any signs of subsidence.
- The site is approximately level, sloping down gently to the west with the ground level highest in the NE corner where the lawn is no more than 50cm above the road level.
- There was evidence of tipping, mainly of household waste.
- Two service covers were noted, one in the NE of the site in the garden area and one in the SE of the site in the tarmac.
- LKC undertook the excavation of 2 no. hand dug trial holes in the northern grassed area of the site. Made ground was noted in both trial holes (maximum 0.35mbgl). The made ground in the northwest of the site contained small amounts of brick. In the northeast however, large amounts of ash, brick and reworked clay were found in the made ground. Made ground was underlain by black sandy silt natural.

Relevant photographs are provided in Plate 4-1.



Photograph 1: View of western side of the existing building.



Photograph 2: Former car park area in the SW area of the site, facing north.

Plate 4-1: Site photographs.



Photograph 3: Western area of the site, facing south.



Photograph 4: Northern area of the site, facing east.



Photograph 5: Entrance to the basement at the northern side of the building.



Photograph 6: Southeastern corner of the site, facing north.

Plate 4-1: Site photographs.

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 LCRM¹⁰, 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, demolition)	- Assuming predominantly reworked natural soils with possible demolition rubble, ash and clinker: Asbestos, heavy metals, sulphates, PAHs¹¹. - Not expected to be a significant source of gas given anticipated depth and nature of Made Ground.
Car park	- Assuming hardstood surface and no signs of spills / leaks on the site surface: No significant contamination source anticipated.
Glass houses	- Possible small scale domestic vegetable growing. No significant pesticide / fertiliser use anticipated.
Nursing Home	- Assuming a boiler house / room has been present: Petroleum hydrocarbons (fuel / oils) and heavy metals, sulphates, PAHs (waste ash and clinker).
Surrounding Area	
Surrounding area	- No significant contamination sources within influencing distance of the site.
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.
Underlying Geology	
Till (clay) over Sandstone	- Possible low-level sulphates. However, not listed as the principal sulphate / sulphide bearing strata in England and Wales¹². - No other significant contamination sources anticipated.
Radon Affected Area	- Radon. - 1-3% of homes above Action Level. No protective measures are necessary in the construction of new dwellings or extensions.

Table 5-1: Potential contamination sources.

¹⁰ Land Contamination Risk Management (LCRM) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

¹¹ Defra (2002). "Potential Contaminants for the Assessment of Land". R&D Publication CLR 8.

¹² BRE (2005). "Concrete in Aggressive Ground". SD1.

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	- Principal Aquifer (bedrock). - No surface water within influencing distance.
Buildings and structures.	
Potable water pipes.	
Flora within future gardens and landscaping.	

Table 5-2: Potential receptors.

5.4 Potential Pathways

Potential pathways are detailed in Table 5-3.

Pathways		
Soil	Human Health ¹³ (residential land use: apartments with shared landscaping)	- Ingestion of soil. - Ingestion of soil-derived indoor dust. - 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.
		- Omitted as no private gardens: ingestion of contaminated vegetables and ingestion of soil attached to vegetables.
		- Windblown dust and fibres to adjacent receptors.
		- Direct contact with receptors (building foundations, services).
Water		- Root uptake.
		- Surface run-off over impermeable surface.
Water		- Infiltration into the ground, through potentially contaminated material (contamination possibly going into solution).
Water and Gas		- Migration through potentially permeable strata and preferential pathways. - Superficial (Till) likely to be low permeability. - Bedrock (sandstone) likely to be relatively permeable. - Preferential pathways: fault on site, 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.

5.5 Preliminary Contamination Conceptual Model

The Preliminary Contamination Conceptual Model is illustrated in Table 5-4 and has identified seven 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 C552¹⁴.

¹³ EA (2008). "Updated Technical Background to the CLEA Model". Science Report – SC050021/SR3.

¹⁴ CIRIA (2001). "Contaminated Land Risk Assessment: A Guide to Good Practice". C552.

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 B.

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.

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 guidance¹⁵) should be adopted by all workers involved with site enabling and construction works. Therefore, this receptor is not considered in the contamination conceptual model.

¹⁵ 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 and dust. - Windblown dust.	- Future site users. - Offsite receptors.	- ACM. - Heavy metals. - PAHs. - Petroleum hydrocarbons. - Other inorganic and organic contaminants.	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, subject to ground conditions encountered.
2	- Inhalation of vapours. - Migration via permeable strata and preferential pathways.	- Future site users. - Offsite receptors.	- Volatile contaminants (hydrocarbons, other volatile organics).	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, subject to ground conditions encountered.
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 no viable gas source and limited pathway (clay anticipated))	Severe	Moderate / Low (low assumed as no significant source / pathway)	No further assessment required.
			- Radon	Unlikely (as 1-3% of homes above action level)	Medium	Low	(1-3%) No protective measures are necessary in the construction of new dwellings or extensions.
4	- Surface run-off. - Migration via permeable strata and preferential pathways. - Perched waters migration.	- Groundwater (Principal Aquifer).	- Mobile contaminants such as metals, PAHs, petroleum hydrocarbons.	Low Likelihood (only minimal mobile contamination anticipated with limited pathway)	Medium	Moderate / Low (low risk assumed given anticipated ground conditions)	Low density intrusive investigation required. Groundwater sampling, subject to ground conditions encountered. Analysis of CoC.
5	- Sulphate attack on concrete.	- Building structure.	- Sulphate.	Low Likelihood (given site history, site conditions, geology and direct contact / pathway)	Mild	Low	Low density intrusive investigation required. Soil analysis of CoC, subject to ground conditions encountered.
6	- Ingestion of tainted water supply.	- Future site users. - Water pipes.	- Organic contaminants such as petroleum hydrocarbons, naphthalene, volatile organics.	Low Likelihood (although some contamination may be present, significant contamination not expected at pipeline depth)	Medium	Moderate / Low (moderate risk assumed until ground conditions confirmed)	Intrusive investigation required. Soil analysis of CoC, subject to ground conditions encountered.
7	- Direct contact (plant uptake).	- Flora.	- Phytotoxic contaminants such as heavy metals.	Low Likelihood (given site history, site conditions and proposed end use)	Minor	Low	No further assessment required.

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 is relatively flat. No significant slope stability risk anticipated. No further assessment required.
Made Ground	Unknown depth and constituent of made ground across the site. Initial information indicates relatively shallow made ground. Possible in-ground structures from previous buildings. Unlikely to be a suitable founding strata unless engineering work is undertaken.
Superficial	Unknown strength of soils for foundation design. Clay anticipated below the site.
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. Clay anticipated below the site.
Sulphate	Unknown sulphate content of the made ground and natural.
Road / Pavement Design	Unknown CBR values for footpath and road design.
Existing building (to be refurbished)	A detailed structural survey of existing building should be undertaken to ensure it is suitable for its proposed end-use. It may be advisable to confirm the depth and type of existing foundations and the strength of the founding strata.

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	Former nursing home building with associated grounds.
Proposed Development	Refurbishment of the existing building with roof dormer addition. Demolition of part 2 storey structure and erection of 4 storey building to be used as residential units class (C3a) with associated amenities and car park.
Main Historical Features	Onsite: House / building with associated grounds. Surrounding Area: Roads, residential, ponds.
Geology / Hydrogeology	Artificial: No BGS recorded artificial. Superficial: Till (diamicton). Unproductive Aquifer. Bedrock: Fault running through site. Sherwood Sandstone NE of fault. Collyhurst Sandstone SW of fault. Principal Aquifer.
Landfills / Infilled ground	No recorded landfills. Potentially infilled ground identified.
Site walkover	building in the east (original building and more recent extension), old car parking in the south and overgrown grassed garden in the north.

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).		Moderate / Low	Intrusive investigation required. Soil analysis of CoC, subject to ground conditions encountered.
PL2: Volatile contaminants posing a risk to future site users via the inhalation of vapours.		Moderate / Low	Intrusive investigation required. Soil analysis of CoC, subject to ground conditions encountered.
PL3: Gas posing a risk to buildings and future site users via the migration of gas into building causing explosion and asphyxiation.	Carbon dioxide & methane	Moderate / Low	No further assessment required.
	Radon	Low	(1-3%) No protective measures are necessary in the construction of new dwellings or extensions.
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.
PL5: Sulphate posing a risk to building via direct contact (sulphate attack).		Low	Low density intrusive investigation required. Soil analysis of CoC, subject to ground conditions encountered.
PL6: Organic contaminants posing a risk to water pipes.		Moderate / Low	Intrusive investigation required. Soil analysis of CoC, subject to ground conditions encountered.
PL7: Phytotoxic metals posing a risk to flora via root uptake.		Low	No further assessment required.

Table 7-2: 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.

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.
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.
Existing building	Detailed structural survey recommended. Unknown depth and type of existing foundations. Unknown strength of the founding strata.

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 ¹⁶ , BS5930 ¹⁷ CIRIA C665 ¹⁸ , RB17 ¹⁹ and BS8485 ²⁰ . 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, with possible supplementary hand dug foundation pits.
PL 1, 2, 5, 6	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	No further assessment required.
PL 4	Groundwater sampling, subject to ground conditions encountered.
PL7	No further assessment required.
Reporting	Information from the above can be used to carry out a contamination and geotechnical assessment and provide a remediation strategy for the site.
Further Considerations (asbestos survey)	Even though no 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 that can advise on the appropriate steps to take in order to have the building suitably surveyed.

Table 7-4: Recommendations.

¹⁶ British Standard (2017). "Investigation of Potentially Contaminated Sites – Code of Practice". BS10175:2017.

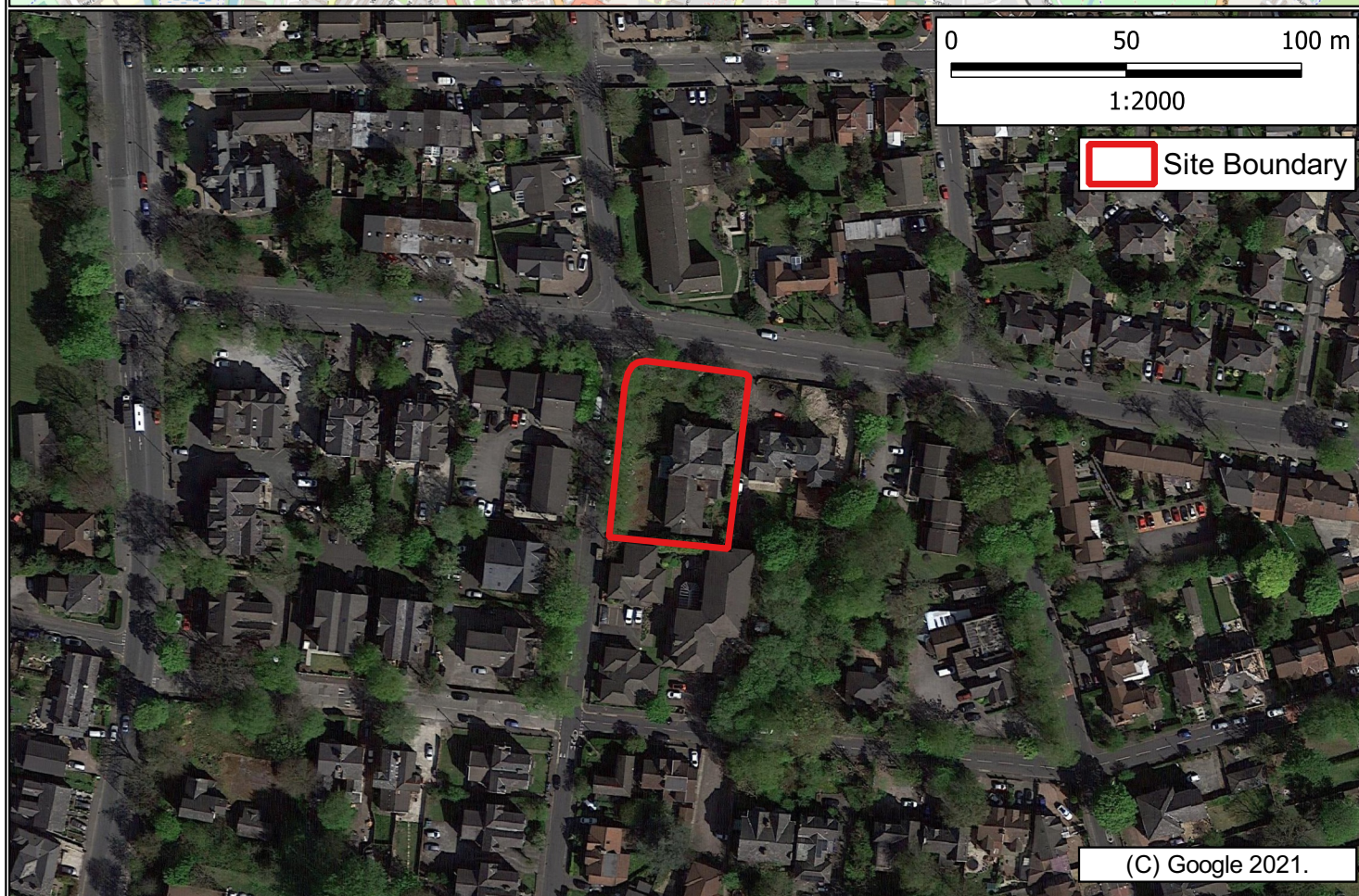
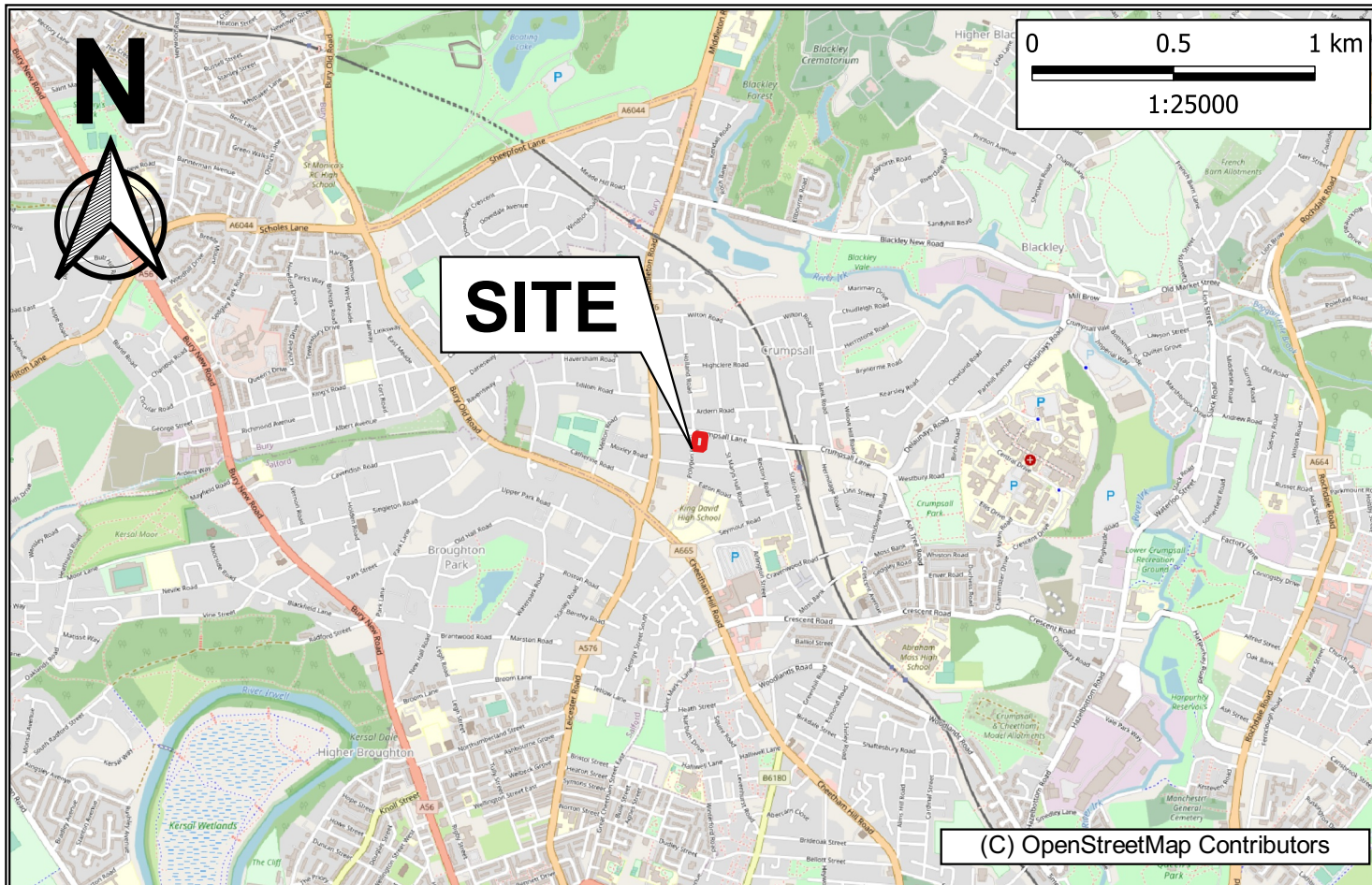
¹⁷ British Standard (2015). "Code of Practice for Ground Investigations". BS5930:2015.

¹⁸ CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings". CIRIA C665.

¹⁹ CL:AIRE Research Bulletin RB17 (November 2012) "A Pragmatic Approach to Ground Gas Risk Assessment".

²⁰ 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: Asjed Qayyum				Title: Site Location & Boundary Plan		
Site: 8 Polygon Road, Crumpsall				Scale (see scale bar): 1:25,000 & 1:2,000 @ A4		
Job No.: LKC 21 1206	Drawn By: CB	Checked By: CH	Drawn: July 2021	Figure: 1	Revision:	



KEY

 Site Boundary

Sampling Locations and features annotated by LK Consult Ltd are approximate and are based upon observed measurements unless otherwise stated. Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information.



Client: Asjed Qayyum			
Site: 8 Polygon Road, Crumpsall			
Title: Proposed Development Plan			
Job No.: LKC 21 1206	Scale (See Scale Bar): 1:250 @ A3	Figure: 2	Revision:
Drawn By: AC	Checked By: CB	Drawn: Jul 2021	

Extract from: Studio Tashkeel Architecture Ltd
Drawing Ref: Proposed Location Plan, No.1811105_02_001

Appendix A

Zetica UXO Pre-Desk Study Assessment

Pre-Desk Study Assessment

Site:	8 Polygon Road, Crumpstall, Greater Manchester
Client:	The LK Group
Contact:	Helen Finch
Date:	8 th July 2021
Pre-WWI Military Activity on or Affecting the Site	None identified.
WWI Military Activity on or Affecting the Site	None identified.
WWI Strategic Targets (within 5km of Site)	The following strategic targets were located in the vicinity of the Site: ■ Salford Docks and Manchester Ship Canal. ■ Transport infrastructure and public utilities. ■ Industries important to the war effort, including munitions factories, aircraft manufacturing, and engineering works. ■ Military barracks and training areas. ■ Anti-Aircraft (AA) guns.
WWI Bombing	None identified on the Site.
Interwar Military Activity on or Affecting the Site	None identified.
WWII Military Activity on or Affecting the Site	None identified.
WWII Strategic Targets (within 5km of Site)	The following strategic targets were located in the vicinity of the Site: ■ Salford Docks and Manchester Ship Canal. ■ Transport infrastructure and public utilities. ■ Industries important to the war effort, including munitions factories, aircraft manufacturing, and engineering works. ■ Military barracks, camps, and training areas. ■ AA and anti-invasion defences.
WWII Bombing Decoys (within 5km of Site)	None.
WWII Bombing	During WWII the Site was located in the County Borough (CB) of Manchester, close to the boundary with Salford CB. Manchester CB officially recorded 737No. High Explosive (HE) bombs with a bombing density of 27 bombs per 405 hectares (ha). Salford CB officially recorded 451No. HE bombs with a bombing density of 86.7 bombs per 405 ha. The Manchester and Salford area was heavily bombed between the 22nd and 24th December 1940 (the 'Manchester Blitz'). Over 400No. HE bombs and more than 30,000 Incendiary Bombs (IBs) fell across the region. Bombing was concentrated on the city centre and docklands area, over 4km south of the Site. No readily available records have been found to indicate that the Site was bombed.
Post-WWII Military Activity on or Affecting the Site	None identified.
Recommendation	A detailed desk study, whilst always prudent, is not considered essential in this instance.

This summary is based on a cursory review of readily available records. Caution is advised if you plan to action work based on this summary.

It should be noted that where a potentially significant source of UXO hazard has been identified on the Site, the requirement for a detailed desk study and risk assessment has been confirmed and no further research will be undertaken at this stage. It is possible that further in-depth research as part of a detailed UXO desk study and risk assessment may identify other potential sources of UXO hazard on the Site.

Appendix B

Risk Evaluation

Risk Evaluation

The method for risk evaluation is a qualitative method of interpreting the output from the risk estimation stage of the assessment, based on CIRIA 552²¹. It involves the classification of the:

- Magnitude of the potential consequence (severity) of the risk occurring (Table A).
- Magnitude of the probability (likelihood) of the risk occurring (Table B).

Consequence (Severity)		
Classification	Definition	Example
Severe	- Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. - Short term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. - Catastrophic damage to buildings/properties. - A short term risk to a particular ecosystem, or organism forming part of such ecosystem (note: the definition of ecological systems within the Draft Circular on Contaminated Land, DETR, 2000).	- High concentrations of cyanide on the surface of an informal recreation area. - Major spillage of contaminants from site into controlled waters. - Explosion, causing building collapse (can also equate to short term human health risk if buildings are occupied).
Medium	- Chronic damage to Human Health ('significant harm' as defined in DETR, 2000). - Pollution of sensitive water resources (note Water Resources Act contains no scope for considering significance of pollution). - A significant change in a particular ecosystem, or organism forming part of such ecosystem.	- Concentrations of a contaminant from site exceed generic, or site specific assessment criteria. - Leaching of contaminants from a site to a major or minor aquifer (Principal and Secondary). - Death of a species within a designated nature reserve.
Mild	- Pollution of non-sensitive water resources. - Significant damage to crops, buildings, structures and services ('significant harm' as defined in DETR, 2000). - Damage to sensitive buildings / structures / services or the environment.	- Pollution of non-classified groundwater. - Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	- Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. - Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc.). - Easily repairable damage to buildings, structures and services.	- The presence of contaminants at such concentrations that protective equipment is required during site works. - The loss of plants in a landscaping scheme. - Discoloration of concrete.

Table A: Classification of consequence.

Probability (Likelihood)	
Classification	Definition
High likelihood	- There is a pollutant linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Likely	- There is a pollutant linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. - Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low likelihood	- There is a pollutant linkage and circumstances are possible under which an event could occur. - However it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	- There is a pollutant linkage but circumstances are such that it is improbable that an event would occur in the very long term.

Table B: Classification of probability.

²¹ CIRIA (2001). "Contaminated Land Risk Assessment: A Guide to Good Practice". C552.

These classifications are then compared to indicate the risk presented by each pollutant linkage (Table C). It is important that this classification is only applied where there is a possibility (which can range from high likelihood to unlikely) of a pollutant linkage existing.

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High likelihood	Very High Risk	High Risk	Moderate Risk	Moderate / Low Risk
	Likely	High Risk	Moderate Risk	Moderate / Low Risk	Low Risk
	Low likelihood	Moderate Risk	Moderate / Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate / Low Risk	Low Risk	Very Low Risk	Very Low Risk

Table C: Comparison of consequence against probability.

Once the risk has been determined the corresponding action can be assessed (Table D).

Risk	Action Required
Very High Risk	- There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. - This risk, if realised, is likely to result in a substantial liability. - Urgent investigation (if not already undertaken) and remediation are likely to be required.
High Risk	- Harm is likely to arise to a designated receptor from an identified hazard. - Realisation of the risk is likely to present a substantial liability. - Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term.
Moderate Risk	- It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. - Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low Risk	- It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very Low Risk	- There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

Table D: Description of the classification and likely action required.

Where LKC identified a low to very low risk either limited 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 work or precautionary remedial measures will be recommended.

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