



Preliminary Risk Assessment

MIRA, Land South of A5, Nuneaton

February 2022

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Comments

1.2.1	Updated client of benefit name to ERI MTP Limited
1.3.1	Updated to correct site boundary

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Contents

Executive Summary

1. Introduction	1
1.1 Objectives	1
1.2 Planning Context	1
1.3 Limitations and Constraints	1
2. Methodology	2
3. Hazard Identification	3
3.1 Site Description and Reconnaissance	3
3.1.1 Site Surroundings	4
3.1.2 Environmental Permits	5
4. Previous Environmental Assessments and Consultations	6
4.1 Previous Environmental Assessments	6
4.2 Consultations	6
4.2.1 Environmental Health	6
4.2.2 Planning Department	6
4.2.3 Building Control Department	6
5. Environmental Site Setting	7
5.1 History	7
5.2 Unexploded Ordnance	8
5.3 Geology	8
5.3.1 Ground Stability	8
5.4 Radon	10
5.5 Ground Gas	10
5.6 Vapour	10
5.7 Controlled Waters	11
5.7.1 Surface Waters	11
5.7.2 Groundwater	11
5.7.3 Flood Risk	12
6. Hazard Assessment and Preliminary Conceptual Model	13
6.1 Contaminants of Concern	13
6.2 Preliminary Conceptual Model	13
7. Conclusions	17
8. Recommendations	18

Contents

Figures

Figure 1:	Current Site Plan	3
Figure 2:	Current Site Layout	7
Figure 3:	Compressible Grounds Stability Risk.....	9
Figure 4:	Identified Secondary A Aquifer in Shallow Ground.....	11

Tables

Table 1:	Potentially Contaminative Activities Identified on-Site	4
Table 2:	Pertinent Site History	7
Table 3:	Site Geology	8
Table 4:	Geological Hazard Risk to the Site	9
Table 5:	Summary of Hydrogeological Properties of the Main Geological Strata.....	12
Table 6:	Contaminants of Concern	13
Table 7:	Outline Conceptual Site Model	14

Appendices

- A. Site Plans
- B. Site Photographs
- C. Ground Gas Risk Assessment
- D. Consultation Information
- E. Regulatory Context
- F. Risk Rating Matrix
- G. Environmental Receptors

Contents

Executive Summary

Objectives

Preliminary Environmental Risk Assessment for ground contamination risks at land south of the A5, Nuneaton. This report is to support a future planning application for redevelopment of the site for commercial use.

Conclusions

Potential contamination risks are identified which should be confirmed through further works. However, considering the proposed end use for the Site as commercial premises, the overall risk rating for the Site is assessed as low.

Site Setting

Current Use	Farmland split across two fields, with farmhouse, small stables and residential oil storage in the eastern field. Electrical substation at the north-west corner of the western field, with pylons running north-south along the western boundary.
History	Farmland, with a former railway line intersecting the north-eastern corner of the Site.
Geology	0.5-1.3m topsoil, or gravel surfacing in farm buildings area over 0.3 to 0.4m Boulder Clay Formation in the western areas of the Site only. Bedrock is Mercia Mudstone, with the base not proven at 6.1m bgl.
Controlled Waters	Boulder Clay Formation is a Secondary A Aquifer. The Mercia Mudstone is a Secondary B Aquifer. Drainage ditches surround and bisect the Site. However, they were dry during the site visit. There are two ponds in the east of the Site, with the northernmost pond dry.
Ground Gas and Vapour	No potential ground gas sources are identified at the Site. Potential minor vapour risk is identified at the oil storage tank at The Elms Farm, and at former railway land in the east of the Site.

Preliminary Conceptual Model

Potential contaminant linkages identified for the Site are as follows:

- Potential for vapour risk to future Site users and structures from current and historical contamination sources such as the oil tank at The Elms Farm, historical railway line and electrical substation;
- Future Site users contacting potential unrecorded ground contamination in areas where future soft landscaping is proposed;
- Construction workers contacting potential ground contamination in shallow soils during redevelopment of the Site, or potential asbestos during demolition of The Elms Farm;
- Chemical properties of natural soils beneath the Site causing chemical attack to future buried structures and services; and
- Construction works encountering potential UXO.

Recommendations

The following actions are recommended to address the potentially unacceptable risks identified:

- Undertake geotechnical and geo-environmental intrusive ground investigation to provide geotechnical parameters across the Site for foundation and buried services design, and target potential contamination sources identified to confirm the risk to future Site users. This investigation could be undertaken following planning permission for the development, secured by way of an appropriately-worded planning condition;
- Construction workers should be provided with, and use appropriate PPE while undertaking works at the Site;
- Works at the Site should be completed in-line with the Control of Asbestos Regulations (2012); and
- Construction workers should be asbestos awareness trained;
- Construction materials and stockpiled soils during the works should be appropriately stored to prevent dust emissions to nearby roads, farms and the wider MIRA complex;
- Potential asbestos was identified within The Elms Farm buildings structures. A Demolition Asbestos Survey should be prepared for these buildings identifying any potential asbestos risks within the structures;

-
- The potential for UXO should be further investigated to confirm the risks to future works at the Site.
-

1. Introduction

1.1 Objectives

Waterman Infrastructure & Environment Limited ("Waterman") was instructed by Waterman Structures Limited on behalf of ERI MTP Limited to undertake a Preliminary Risk Assessment (PRA) for ground contamination at masterplan land south of the A5, Nuneaton (hereafter termed "the Site").

The PRA will include a preliminary conceptual model for the Site, identifying potential pollutant linkages in relation to ground contamination. This will be achieved through a desk top review of the Site and surrounding area's environmental setting, history, and current uses. The preliminary conceptual model will incorporate a critical review of the sources pathways and receptors in line with Land Contamination Risk Management (LCRM) 2021.

1.2 Planning Context

The purpose of this report is to support a future masterplan planning application for development of the Site as an expansion to the adjacent MIRA complex to the north. The proposed development has not been finalised but will involve demolition of all existing structures and construction of new commercial buildings, with car parking, soft landscaping and attenuation ponds. An outline development layout is included in Appendix A.

1.3 Limitations and Constraints

The assessment was undertaken in accordance with the scope agreed between Waterman IE and Waterman Structures, as documented in Waterman's fee letter (*WIB13833-118-20210604-CWS-Fee, dated June 2021*), and with Waterman's standard Terms of Appointment.

The information contained in this report is based on a review of available historical, geological and hydrogeological sources, consultation with the regulatory authorities and observations made during a Site walkover on 3 September 2021.

Waterman has endeavoured to assess all information provided to them during this investigation but makes no guarantees or warranties as to the accuracy or completeness of this information.

The scope of this ground investigation includes an assessment of the presence of asbestos containing materials in the ground at the Site but not within buildings or structures or below ground structures (basements, buried service ducts and the like).

The conclusions resulting from this study are not necessarily indicative of future conditions or operating practices at or adjacent to the Site.

2. Methodology

This PRA has been undertaken in general accordance with Land Contamination: Risk Management Guidance (LCRM: Environment Agency, April 2021).

The report includes the following:

- Definition of overall Site objectives
- Collation of available current and historical information about the Site and the potential contaminants expected to be present;
- A Site walkover;
- Formulation of an preliminary Conceptual Model;
- Qualitative risk assessment; and
- Record of findings and recommendations for further action.

3. Hazard Identification

3.1 Site Description and Reconnaissance

The Site comprises a farmland centred at National Grid Reference 436148, 295045, south of the A5 road and existing Horiba MIRA facility in Caldecote, Nuneaton. The Site extends to roughly 59 hectares within the Site boundary.

Figure 1: Current Site Plan



Source: Groundsure Enviro Insight Report 2021

The Site comprises four fields, with three smaller fields to the east and larger field to the west. All fields are in agricultural use and separated by hedgerows. A series of farm buildings are in the centre of the eastern field, accessed via a farm track at the eastern Site boundary.

Elm Farm Buildings

Elm Farm comprises a main farmhouse building and secondary wooden workshop building. These buildings were occupied at the time of the walkover and not accessed internally. The main building is two-storey, brick construction and is connected to a brick barn structure and stables to the west. The roof of this barn structure was noted to potentially be corrugated asbestos sheeting.

The main building is surrounded by gravel surfacing, with drainage from the roof directed to a 1,000 litre intermediate bulk container located at the north-east corner of the building. A 1,412 litre internally bundled

oil storage tank is also here, sited on paving slabs. Accompanying pipework for this tank runs underground to the main building. At the time of the walkover this tank was observed to be around 80% full. No drips, leaks or spills were observed from this tank.

To the east of the Site is a small vegetable garden with greenhouses and a hen coop.

The secondary workshop building is north of the main farm building and is of wood construction. This barn is in use for tools, farm equipment and wood storage. A berm approximately 2m high runs along the northern wall of this workshop, overgrown with shrub plants and grass. The berm consists of Made Ground, with fragments of brick and concrete visible.

Elm Farmland

The majority of Elm farmland is in agricultural use. To the north-west of the north-westernmost field an electrical substation is present operated by Western Power Distribution. This substation appeared to be a recent design and was in good condition, however historical mapping details a substation in this location first installed between 1988 and 1994. Drainage ditches bound the Site within hedgerows to the south, east and west boundaries, with a ditch also present in hedgerows running north-south to separate the eastern and western fields. These drainage ditches were all observed to be dry during the walkover.

At the eastern Site boundary, a series of small heaps of crushed asphalt, crushed bricks and hardcore are situated. Asbestos containing materials were not observed on the surface of these stockpiles.

Two large ponds are within the eastern field, surrounded by dense foliage. The southernmost contained water, along with a heap of scrap metal. The northernmost was dry at time of walkover.

A Site location plan and Site layout plan are in Appendix A. A selection of photographs taken during the Site inspection is in Appendix B. A Groundsure dataset has been procured for the Site and surrounding area, included in Appendix D.

Current potentially contaminative site uses were identified during the Site inspection and are listed in Table 1.

Table 1: Potentially Contaminative Activities Identified on-Site

Potential Issue	Description	Condition
Aboveground Storage Tank (and fuel lines)	1,412 litre household oil storage tank.	In good condition, internally banded and on raised platform with no evidence of leaks or spills noted.
Hazardous material storage	Potential for Polychlorinated Biphenyls within electrical substation.	Electrical substation appeared of modern design, however historical mapping indicates a substation has been in this area before 2000 and may have contained PCBs.
Drainage	Main building drainage is directed to 1,000 litre IBC, remainder of Site does not have built drainage infrastructure but drainage ditches are present around Site boundary and eastern/western field boundary.	IBC in good condition, drainage ditches surrounding the Site clear and free of litter.
Waste materials	Crushed asphalt, brick and concrete hardcore stockpiles at east of the Site	Asbestos containing materials not observed on surface of stockpiles.
	Scrap metal abandoned at surface water pond in the south	Scrap metal had corroded and was in poor condition.

3.1.1 Site Surroundings

The Site is bounded by the A5 motorway to the north and A444 road to the south. The eastern boundary of the Site is a farm track running north to south, and a footpath following the former railway line.

Farmland and farm buildings are further east and to the west.

Land uses surrounding the Site are predominately industrial, including the Horiba MIRA facility north of the A5. Arable farmland is located to the south, east and west with the residential area of Weddington further east.

Ecological Areas

The Groundsure dataset does not identify any sensitive ecological receptors within 1km of the Site.

Heritage and Archaeology

The Groundsure dataset does not identify evidence for any heritage/archaeological features within 1km of the Site.

3.1.2 Environmental Permits

The Groundsure dataset does not identify any Environmental Permits (EPs) registered within the Site boundary. In the surrounding area the following EPs are registered within 500m of the Site:

- Licensed pollutant release registered to Horiba MIRA 68m north, authorising transfer of petrol to a service station supplying the MIRA vehicle testing areas.
- Two Radioactive Substances Authorisations are registered for keeping and use of radioactive substances at buildings at the MIRA complex 32m north and 108m north-east.

4. Previous Environmental Assessments and Consultations

4.1 Previous Environmental Assessments

No previous environmental assessments relating to the Site have been provided for review. No environmental assessments pertaining to the Site were available for review on the Bedford and Nuneaton Council Planning Portal.

4.2 Consultations

4.2.1 Environmental Health

An information request was made to the Environmental Health Officer at Nuneaton and Bedworth Council in August 2021. A response has not been received.

4.2.2 Planning Department

An information request was made to the Planning Department at Bedford and Nuneaton Council in August 2021. The planning department reported they had no records of planning permission for tanks on or below ground within the Site area, and that they did not hold any further information relating to the Site.

A search of the Nuneaton and Bedworth Planning portal (accessed online 16 August 2021) did not identify any recent planning applications relating to the Site. A single historical application was registered to the Site in 1996, for permitted construction of a new farm shed.

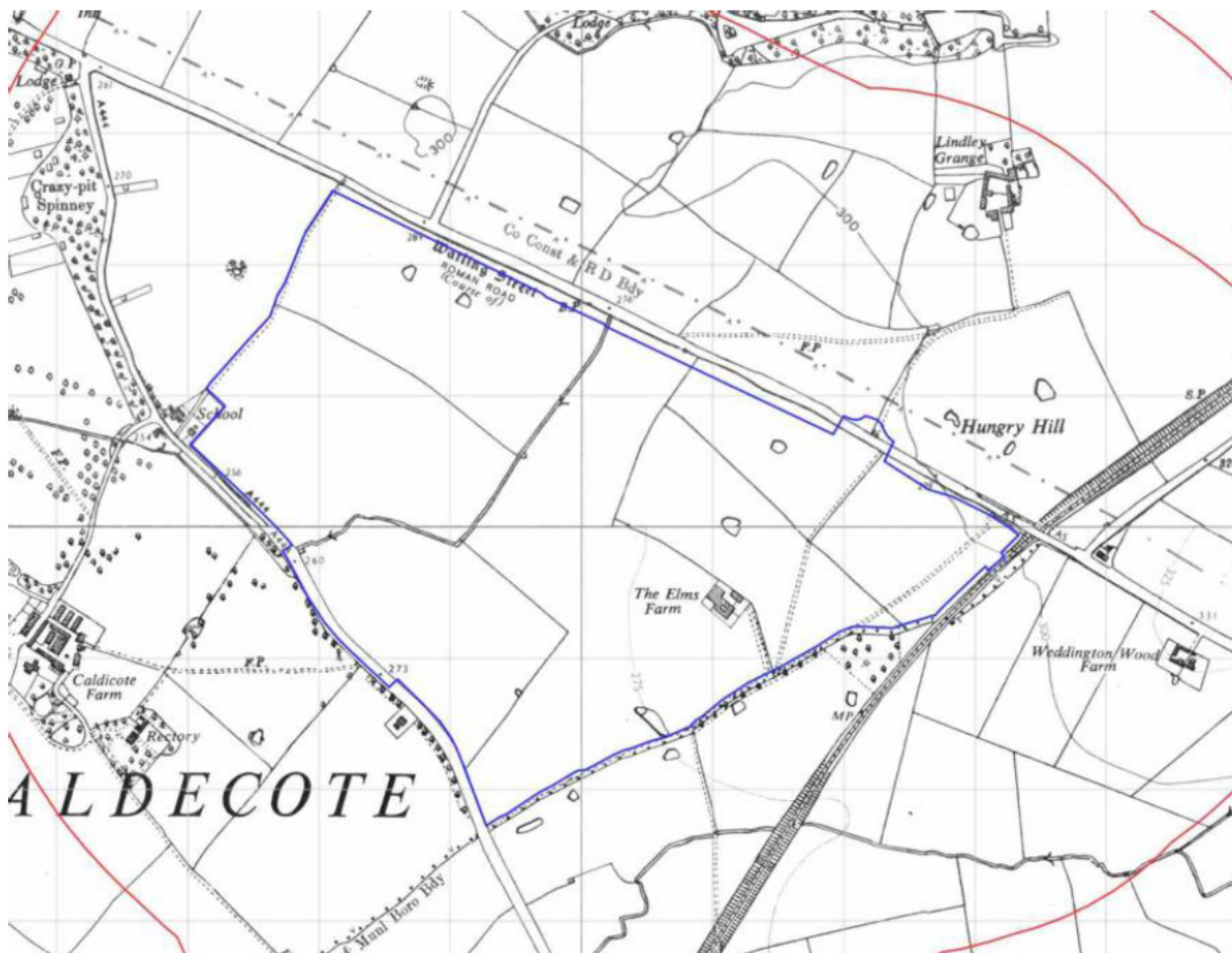
4.2.3 Building Control Department

An information request was made to the Building Control Department at Bedford and Nuneaton Council in August 2021. The building control officer reported they had no information available relating to the Site.

5. Environmental Site Setting

5.1 History

Figure 2: Current Site Layout



Source: Groundsure Enviro Insight Historical Map extract 1950-1955

A summary of historical potential contamination sources at the Site and surrounding areas identified through Groundsure dataset and historical maps is included in Table 2.

Table 2: Pertinent Site History

Date, Source maps, scale	Feature	On-Site/distance off-site
1887-1902	Farmland and buildings of Elm Farm	Across Site
	Small ponds at centre-east field	On-Site
	Ashby and Nuneaton Joint Railway Line	Running north to south off-Site, intersecting the easternmost edge of the Site.
1905-1943	Farmland and farm buildings	Surrounding 1km area
1943-1946	Shooting range and tanks	600m east
1943-1946	WWII Lindley Airfield	500m north-east
1958	Small surface mine	210m west
1961	Motor Industry Works (MIRA)	40m north

Date, Source maps, scale	Feature	On-Site/distance off-site
	Tank noted at nearby farm buildings	450m north
1965-1973	Aerodrome	500m north and north-east
	Shooting range and tanks no longer present	600m east
	Surface mine appears to be infilled	210m west
1973	Works north of the Site have expanded to replace the former aerodrome with roads and testing tracks	40m north
1978	Railway line running north to south no longer present	Off-Site and intersecting eastern corner of the Site
1986	Electrical substation at road	40m north
1994	Electrical substation	On-Site at north-eastern corner
	Second electrical substation recorded at MIRA building	40m north
1994-2010	No significant changes	-
2021	New residential development	300m south-east
2022	No significant changes	

5.2 Unexploded Ordnance

Information relating to the UXO risk present at the Site is not available. However, considering the former WWII aerodrome adjacent to the north and undeveloped nature of the Site, it is recommended a UXO desk study be completed to identify any risk prior to any intrusive works.

5.3 Geology

Geology on-Site has been established from British Geological Survey (BGS) mapping (1:50,000 series sheet 159 (Coventry) map, solid and drift edition) and nearby BGS borehole logs (references SP39SE314, E315, SP39NE16 and NE17 to the south, SP39SE340 to SE341 to the west and SP39NE19 to NE22 to the north). Geology is summarised in Table 3.

Table 3: Site Geology

Stratum	Area Covered	Estimated Thickness	Typical Description
Topsoil, or gravel surfacing in farm buildings area	Entire Site	0.5-1.3m	Dark grey silty-sandy clay with occasional rootlets
Boulder Clay (Lacustrine and Glaciofluvial deposits)	Western area of the Site	0.3-0.4m	Brown sandy clay with cobbles of mudstone and silty interbeds
Mercia Mudstone	Entire Site	Base not proven at 6.1m bgl	Very closely fissured grey, mottled red-brown silty clay with occasional gravels.

5.3.1 Ground Stability

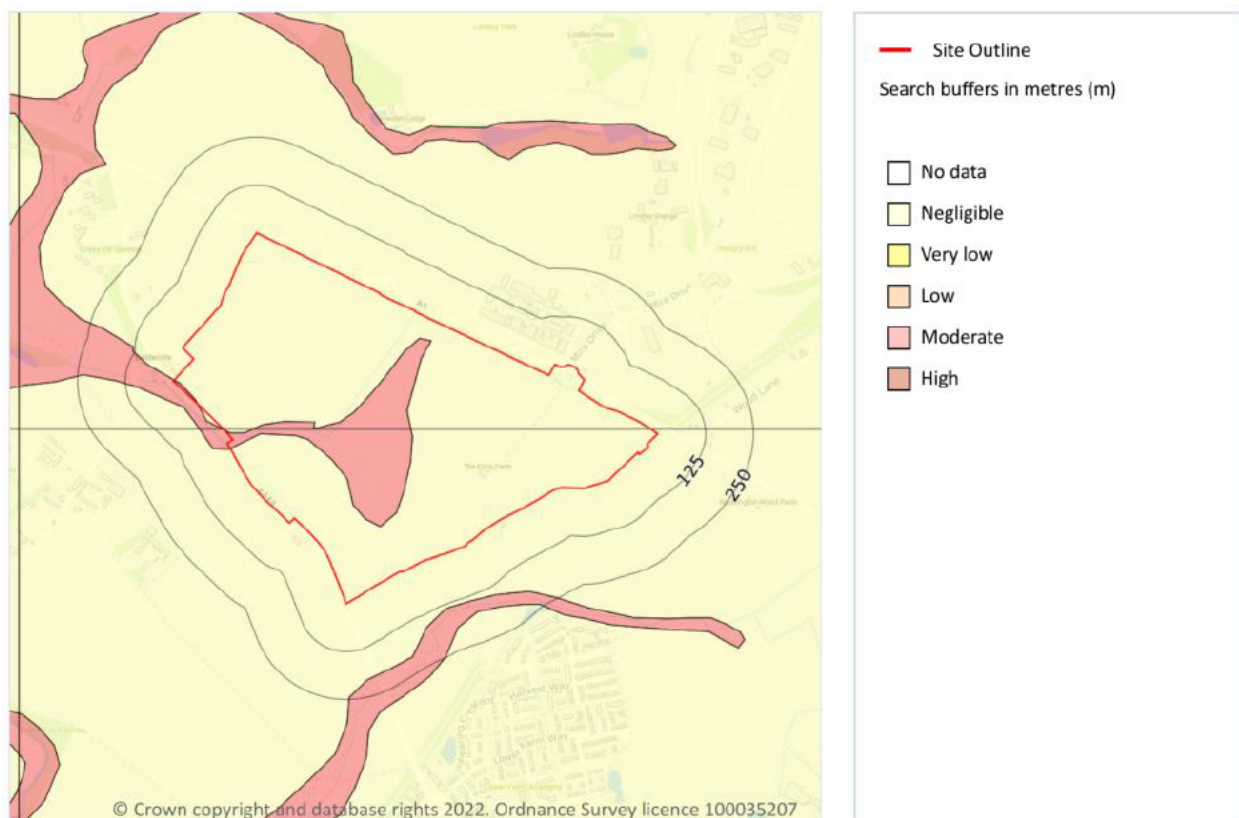
The Groundsure dataset has identified the following geological hazard risk ratings for the Site, set out in Table 4.

Table 4: Geological Hazard Risk to the Site

Geological Hazard	Risk
Shrink/swell clays	Very Low
Landslides	Very low
Ground dissolution of soluble rocks	Negligible
Compressible deposits	Negligible across the majority of the Site, with small area identified as moderate risk associated with Boulder Clay in the west
Collapsible deposits	Very low to negligible
Running sand	Negligible

The risk for compressible deposits across the Site is detailed in Figure 3.

Figure 3: Compressible Grounds Stability Risk



Source: Groundsure Enviro Insight Compressible Ground Stability Map

The BGS map does not identify any structural, geomorphological or geochemical features on or near to the Site. The Site is not in an area that could be affected by coal or metalliferous mining activity.

The Groundsure dataset identified underground manganese mining of restricted extent may have occurred on-Site. However, potential for difficult ground conditions is unlikely and localised and is assessed to be at a level where they need not be considered.

5.4 Radon

The Groundsure report identifies the Site within an area where less than 1% of homes are above the action level for Radon. Correspondingly, radon protection measures are not considered necessary in new developments at the Site.

5.5 Ground Gas

As identified in the CL:AIRE 2012 RB17 and CIRIA C665 guidance documents, ground gases only pose a risk to developments when the following conditions are present at a Site;

- An accumulation of a large volume of gas in the ground in or near the buildings (source).
- A pathway that allows gas to migrate through and/or out of the ground into a building or other structure sufficiently quickly to allow it to build up inside the building (pathway).
- A confined space within the building or structure where gas can build up to unacceptable levels (receptor).

In order for a risk from ground gases a source – pathway – receptor linkage needs to be present. This requires a sufficient quantity of gas to pose a hazard and one or more pathways by which it may cause significant harm to people. For sustained gas migration to occur gas must be replenished at the source to negate the effects of attenuating factors such as oxidation of the methane/carbon dioxide to oxygen in the aerobic zone or low permeability soils decreasing the migration potential.

Therefore, sustained high levels of gas generation are required for ground gas to migrate via advective or diffusive flow and cause high ground gas concentrations within built structures. The volume of ground gas is therefore the principal factor which should be considered rather than the ground gas concentration and not the gas concentration present in the ground (or monitoring well) which is commonly mistaken as posing a risk to future Site users.

No significant sources of ground gas have been identified on Site.

A summary of the ground gas risk has been set out using the Waterman Ground Gas Risk Assessment Tool, with results reproduced in Appendix C. Following assessment, the Site is considered a very low risk for ground gas issues. Based on the sensitivity of the end-use receptor, no further ground gas investigation or assessment is considered necessary.

5.6 Vapour

An inspection of the Site in August 2021 did not identify any land uses with the potential to result in ground contamination with vapour risks to the Site. Groundsure information for the Site identified an oil tank present at Elms Farm in the centre of the Site, along with historical records for a tank at this location circa 1961. Further tanks are noted at the MIRA facility 163m north and 376m north. Historical railway land is also identified at the north-east of the Site, with potential for hydrocarbon contamination.

The Groundsure dataset records a single pollution incident within 250m of the Site, involving a spill of diesel 88m east in March 2003. This was assessed by the EA as having a minor impact to land receptors, and no impacts to air or water receptors.

Considering the assessed impact of identified sources there is not a significant risk of vapours across most of the Site. However, the oil tank and historical railway land should be investigated to confirm no contamination has arisen from these potential sources that could represent a vapour risk.

5.7 Controlled Waters

5.7.1 Surface Waters

Drainage ditches surround the Site and run north to south adjacent to the hedgerows separating the eastern and western fields. This ditch outflows to the nearby River Anker off-site to the west, and at the time of the walkover was observed to be dry. Two ponds are in the centre-east of the Site. The northern of these was found to be dry at the time of the walkover, with water present in the southern feature.

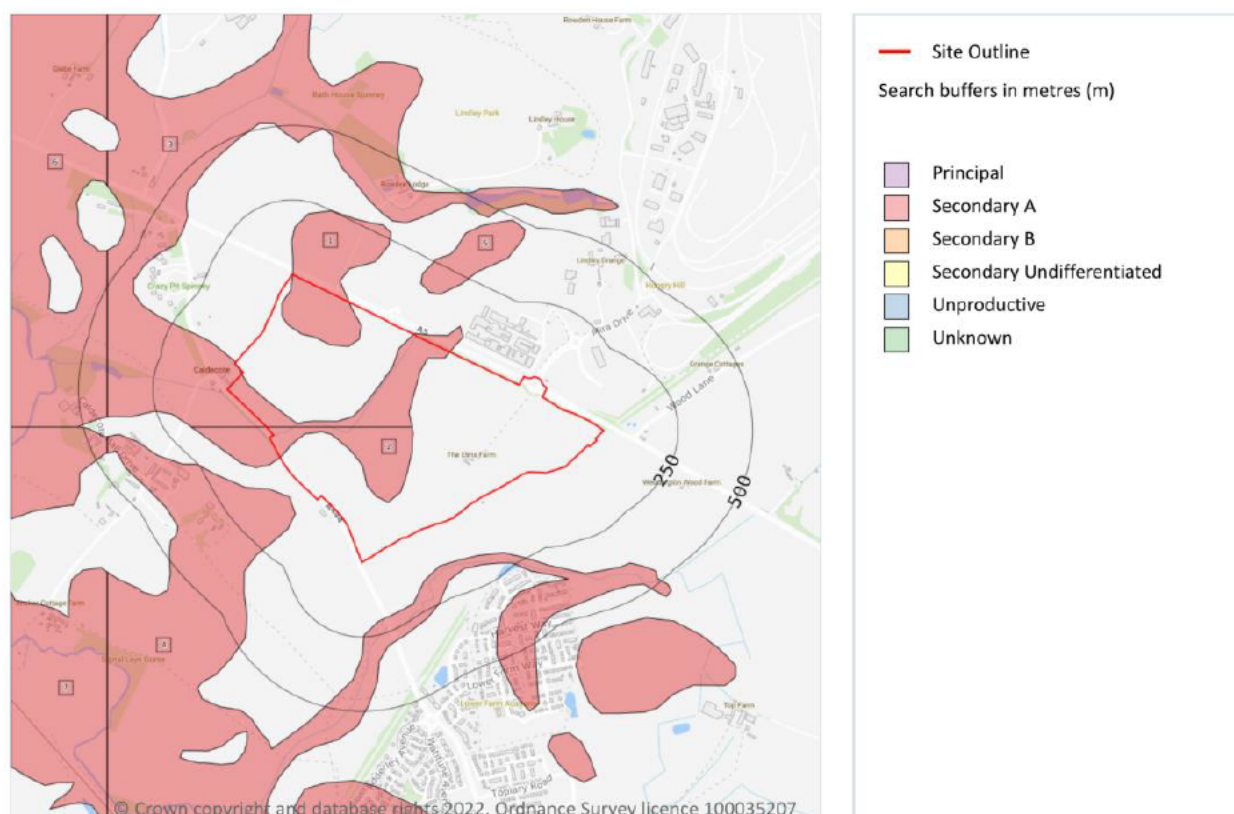
The nearest recorded surface water to the Site is a series of rivers and surface ponds at Caldecote Brook located 480m north of the Site. The River Anker is 575m west.

The drainage ditches, ponds and Caldecote Brook have not been classified for Ecological Potential by the EA under the Water Framework Directive. The River Anker has been assessed with a 'good' ecological and chemical rating.

No surface water abstractions are recorded within 1km of the Site. A single discharge consent is detailed, 56m north-east authorising trade discharge to Caldecote Brook.

5.7.2 Groundwater

Figure 4: Identified Secondary A Aquifer in Shallow Ground



Source: Groundsure Enviro Insight Shallow Hydrogeology Map

The EA identifies the hydrogeological properties of the geological deposits beneath the Site as set out in Table 5.

Table 5: Summary of Hydrogeological Properties of the Main Geological Strata

Stratum	Area Covered	EA Classification	Hydrogeological Description
Topsoil or Hardstanding in farm buildings area	Entire Site	Not classified	Contains insignificant quantities of vertically or laterally extensive groundwater
Boulder Clay Formation (Lacustrine and Glaciofluvial deposits)	Western area of the Site	Secondary A Aquifer	May be important in supporting local abstractions or in providing baseflow to rivers and streams
Mercia Mudstone	Entire Site	Secondary B Aquifer	Predominantly lower permeability layers which may store and yield limited amounts of groundwater

The Site is not in a groundwater Source Protection Zone. No groundwater abstractions are recorded within 1km of the Site. A single discharge consent is 137m west, for discharges of treated sewage to shallow ground.

5.7.3 Flood Risk

EA indicative flooding data indicates the Site is within an area at low-negligible risk of groundwater flooding.

Small areas of the Site surrounding the hedgerows and drainage ditches, in the centre of the Site and in the east of the Site are noted as having between a 1 in 1,000 and 1 in 30 risk of surface water flooding.

6. Hazard Assessment and Preliminary Conceptual Model

6.1 Contaminants of Concern

Contaminants of concern identified at the Site are summarised in Table 6. The potential contaminants associated with former and current land uses are informed by DoE Industry Profiles (1995) where applicable.

Table 6: Contaminants of Concern

Source	Associated Contaminants
On-Site (current)	
Agricultural practices	Pesticides
Oil tank at The Elms Farm	Hydrocarbons
Electrical substation	Metals, hydrocarbons, polychlorinated biphenyls
Elm Farm buildings	Asbestos
Waste materials (scrap metal, concrete and hardcore, asphalt)	Metals, asbestos
On-Site (historic)	
Agricultural practices	Pesticides, herbicides and fuel storage
Made Ground	Metals, hydrocarbons, asbestos
Former railway lines	Hydrocarbons, PAHs, VOCs and SVOCs
Off-Site (current)	
MIRA vehicle proving ground	Hydrocarbons and metals
Off-Site (historic)	
Former WWII Lindley Airfield	Hydrocarbons, metals, asbestos
Former railway lines	Hydrocarbons, metals

6.2 Preliminary Conceptual Model

The Preliminary Conceptual Model for the Site is presented in Table 7 and graphically in Appendix A. The risk rating included in Table 7 has been assessed qualitatively using the criteria given in Appendix F and the potential receptors identified using the criteria given in Appendix G.

Table 7: Outline Conceptual Site Model

Potential Sources	Linkage	Receptor	Risk	Justification / Mitigation	Residual Risk
Human Health					
Potential contaminants in shallow soils and Made Ground arising from oil storage at The Elms Farm, and electrical substation in north-west of the Site, and historical railway land in the north-east.	Direct contact, ingestion and inhalation of potentially contaminated soils Contamination uptake via plants in private gardens at the new development	Future Site residents and users	Low	Historical land uses at the Site are farmland, with relatively low potential for ground contamination. However, minor localised contamination may have arisen at The Elms Farm via the oil tank, through storage of farm equipment and/or chemicals such as pesticides or herbicides, or from potential asbestos in structures or dumped at the Site. Contamination may also have arisen from the electrical substation in the north-west, and former railway line in the north-east. Construction of new buildings and hardstanding will prevent future Site users contacting any ground contamination across most of the Site. However, the proposed development design will include soft landscaped areas, through which future Site users could potentially contact ground contamination. Geotechnical ground investigation will be necessary at the Site to provide information for structural and foundations design. As part of this, environmental sampling should be undertaken, including specifically targeting The Elms Farm, the electrical substation and the former railway land. This would identify any ground contamination and inform the requirement for any remedial measures within gardens and landscaped areas.	Low
Ground gas arising from Made Ground	Inhalation, accumulation in confined spaces		Low	No significant sources of ground gas generation have been identified at or close to the Site. The risk presented by ground gas to future developments is very low.	Low
Vapours arising from historical and current oil storage at The Elms Farm	Inhalation, accumulation in confined spaces		Low	The oil tank identified at The Elms Farm was found to be in good condition, without evidence of leaks or spills. Ground investigation at the Site would identify any contamination arising from this tank or other sources such as the historical railway line and inform any mitigation necessary.	Low

Potential Sources	Linkage	Receptor	Risk	Justification / Mitigation	Residual Risk
Potential contaminants within shallow soils	Leaching and migration off-Site through Secondary A Aquifer in the Boulder Clay Formation	Off Site residents/users	Low	Limited significant potentially contaminative land uses have been identified at the Site. However, if present, contamination could be mobilised off-site through shallow groundwater in the Boulder Clay Formation. Ground investigation would confirm the contamination status of shallow soils and groundwater. This would indicate the requirement for any mitigation measures.	Low
Potential contaminants within shallow soils	Direct contact, ingestion and inhalation	Construction Workers	Low	Ground investigation at the Site will inform the potential for contaminated land to be present at the Site. The mandatory use of PPE such as gloves, and provision of basic hygiene measures should ensure that the risk to construction personnel from contact with potential ground contamination is minimised. Construction workers should have asbestos awareness training and works should be undertaken in line with the Control of Asbestos Regulations 2012.	Low
Structures					
Aggressive chemical conditions in shallow soils	Direct contact	Building foundations and buried infrastructure	Low	The findings of the ground investigation would identify the potential for aggressive ground conditions and inform the appropriate classification of concrete to be used in new structures.	Low
Ecological Receptors					
Potential contaminants within shallow soils	Root contact leading to uptake	Plants at new soft landscaping	Low	Ground investigation would confirm the contamination status of shallow soils and groundwater beneath the Site. This would in turn inform the requirement for any mitigation measures.	Low
Controlled Waters					
Potential contaminants within shallow soils	Rainfall-driven leaching and	Secondary A aquifer within the	Low	On completion of the redevelopment works most of the Site would be occupied by new buildings, hardstanding and	Low

Potential Sources	Linkage	Receptor	Risk	Justification / Mitigation	Residual Risk
	migration to shallow groundwater	Boulder Clay Formation Secondary B Aquifer within Mercia Mudstone		infrastructure. These features will direct rainwater to managed drainage, reducing infiltration into ground. This in turn will reduce a potential driver for contamination migration off-site. In soft landscaped areas, this pathway will remain present. However, geological and hydrogeological information indicates the Boulder Clay Formation is not continuous across the Site and continuous groundwater is not present in the Mercia Mudstone. Therefore, there is limited potential for shallow ground contamination migration to cause impacts to aquifers within this stratum.	
Potential contaminants within shallow soils and shallow groundwater in the Boulder Clay Formation Secondary A Aquifer or Mercia Mudstone Secondary B Aquifer.	Lateral migration to surface water features	Drainage ditches surrounding the Site and new attenuation ponds proposed.	Low	Geological and hydrogeological information indicates the Boulder Clay Formation is not continuous across the Site, and the Mercia Mudstone is not a significant aquifer. There is limited potential for lateral contamination migration via groundwater in these strata.	Low

7. Conclusions

Potential contamination risks are identified which should be confirmed through further works. However, considering the proposed end use for the Site as commercial premises, the overall risk rating for the Site is assessed as low.

Potentially Unacceptable Risks

Potential contaminant linkages identified for the Site are as follows:

- Potential for vapour risk to future Site users and structures from current and historical contamination sources such as the oil tank at The Elms Farm, historical railway line and electrical substation;
- Future Site users contacting potential unrecorded ground contamination in areas where future soft landscaping is proposed;
- Construction workers contacting potential ground contamination in shallow soils during redevelopment of the Site, or potential asbestos during demolition of The Elms Farm; and
- Chemical properties of natural soils beneath the Site causing chemical attack to future buried structures and services.

The recommendations of this report outline preliminary remedial and mitigation measures that require confirmation through additional works. However, once successfully implemented the risks are anticipated to be Low. Therefore, the NPPF requirement that on completion the Site can no longer be captured under the Part IIA regime is expected to be met.

8. Recommendations

The following actions are recommended to address the potentially unacceptable risks identified:

- Undertake geotechnical and geo-environmental intrusive ground investigation to provide geotechnical parameters across the Site for foundation and buried services design, and target potential contamination sources identified to confirm the risk to future Site users. This investigation could be undertaken following planning permission for the development, secured by way of an appropriately-worded planning condition;
- Construction workers should be provided with, and use appropriate PPE while undertaking works at the Site;
- Works at the Site should be completed in-line with the Control of Asbestos Regulations (2012); and
- Construction workers should be asbestos awareness trained;
- Construction materials and stockpiled soils during the works should be appropriately stored to prevent dust emissions to nearby roads, farms and the wider MIRA complex;
- Potential asbestos was identified within The Elms Farm buildings structures. A Demolition Asbestos Survey should be prepared for these buildings identifying any potential asbestos risks within the structures;
- The potential for UXO should be further investigated to confirm the risks to future works at the Site.



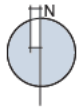
APPENDICES

A. Site Plans

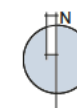
- **Site Location Plan**
- **Site Plan**
- **Proposed Outline Development Plan**
- **Conceptual Site Model**

Appendices

Preliminary Risk Assessment
Document Reference: WIE13833
WIE13833-118-R-1.3.1-RJM



Project Details	WIB13833-118: MIRA Land South of A5
Figure Title	Figure A1: Site Location Plan
Figure Ref	WIB13833-118_GR_PERA_A1B
Date	March 2022
File Location	\\s-inc\swiet\projects\leed13833\118\graphics\pera\issued figures



Project Details	WIB13833-118: MIRA Land South of A5
Figure Title	Figure A2: Site Plan
Figure Ref	WIB13833-118_GR_PERA_A1A
Date	September 2021
File Location	\\s-incs\wiel\projects\leed13833\118\graphics\peral\issued figures

Rev	Date	By	Description
-----	------	----	-------------



Key:

-  Yard
-  Parking
-  Cycle / ped / autonomous vehicle linkage
-  SUDS ponds
-  trees / Hedgerows

FLOOR AREA = 2,080,000 sq ft

Note -
floor area stated is ground floor
footprint only.

SGP

Architects + Masterplanners

Waterfront House
2a Smith Way
Grove Park
Enderby
Leicester LE19 1SX

t: +44 (0)116 247 0557

www.stephengeorge.co.uk

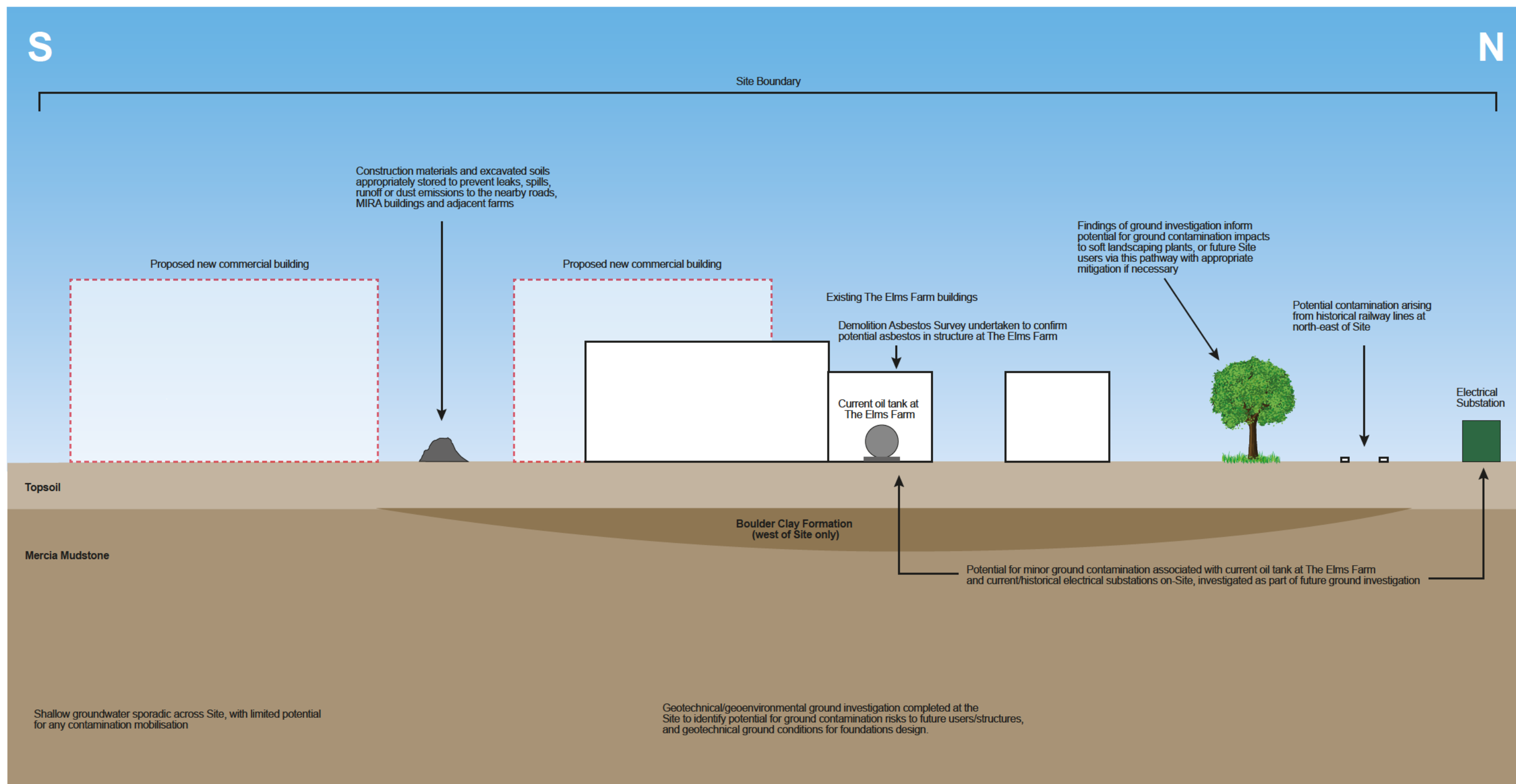
MIRA South Site

Drawing Name:
Masterplan Option 4

Drawing Stage:	PRELIMINARY						
Suitability:	S0 - Work In Progress						
SGP File Ref:	21-092-F004						
21-092	06/08/21	NV	IY	1:5000	@ A1	-	
SGP Project No:	Date:	Drawn:	Team:	Scale:		Rev:	
Drawing Number:							
21092 -SGP-XX- 00 - DR - A - 010004							
Project Code	Originator	Volume	Level	Type	Role	Number	

Red Line Boundary based on O/S Data and NOT confirmed as the Legal Boundary

This drawing, the works and concepts depicted are copyright of Stephen George + Partners LLP and may not be reproduced or made use of, either directly or indirectly without express written consent. Do not scale off this drawing. All heights, levels, sizes and dimensions to be checked on site before any work is put to hand.



Project Details

WIB13833-118: MIRA Land South of A5

Figure Title

Figure A3: Conceptual Site Model

Figure Ref

WIB13833-118_GR_PERA_A3A

Date

September 2021

File Location

\\s-incs\wiel\projects\leed13833\118\graphics\peral\issued figures



B. Site Photographs

- **Plates 1 – 12**

Appendices

Preliminary Risk Assessment
Document Reference: WIE13833
WIE13833-118-R-1.3.1-RJM



Site entrance from A444 to the south



View north across The Elms Farm fields



The Elms Farm buildings



Barn structures and workshops at The Elms Farm



Rear of workshop buildings with earth mound



Stable buildings at The Elms Farm

Project Details	WIB13833-118: MIRA Land South of A5
Figure Title	Figure B1: Site Photographs
Figure Ref	WIB13833-118_GR_PERA_B1A
Date	September 2021
File Location	\\s-incs\wiel\projects\eed13833\118\graphics\pera\issued figures
www.watermangroup.com	



Oil storage tank at The Elms Farm



Electrical substation at north-western Site boundary



Heaped crushed asphalt, hardcore and brickwork at eastern Site boundary



Northern pond, observed dry at time of walkover



Waste metal at southern pond



View south across the Site from A5 road

Project Details	WIB13833-118: MIRA Land South of A5
Figure Title	Figure B2: Site Photographs
Figure Ref	WIB13833-118_GR_PERA_B2A
Date	September 2021
File Location	\\s-Incs\wiel\projects\leed13833\118\graphics\pera\issued figures
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C. Ground Gas Risk Assessment

Appendices

Preliminary Risk Assessment
Document Reference: WIE13833
WIE13833-118-R-1.3.1-RJM

Table C.1:Waterman Ground Gas Risk Assessment Tool

Parameter	Select parameter	Assessment score	Impact on ground gas risk to completed development	Reasoning	Supporting guidance and reference
Is there an existing Ground Investigation report for the Site?	No	0	Refer to available online resources i.e. BGS online	Information from online resources such as the Groundsure/Landmark Environmental report and BGS datasets will provide a general understanding of the likely ground conditions at the Site.	
Is the Site within 20m of an area of former coal mining or landfilling?	No	0	Reduces risk	The absence of coal mining or landfills close to the Site removes a significant potential source of ground gas risk	Developers (2017) [Section 2.2, Page 7] CL:A RE: Research Bulletin RB17 A Pragmatic Approach to Ground Gas Risk Assessment (November 2012) [Section 3, Page 3] EPG: Ground Gas Information Sheet 3 Screening approach for landfill gas migration around landfill sites (November 2018) [Page 2]
Is the Site in an area at risk of radon?	No	0	No impact on risk	protective measures that could also mitigate ground gas risk.	Building Research Establishment: BRE 211 Radon - Guidance on protective measures for new buildings [Section 5 Page 6]
Primary soil type assessed	Sand, Silt or Mudstone	0	Reduces risk	Strata of this type do not contain material capable of ground gas generation, and do not represent a significant risk for methane generation.	CL:A RE: Research Bulletin RB17 A Pragmatic Approach to Ground Gas Risk Assessment (November 2012) [Section 3, Page 3] EPG: A pragmatic approach to ground gas risk assessment for the 21st Century (2011) [Page 2]
Secondary soil type assessed (if assessing multiple strata)	Sand, Silt or Mudstone	0	Reduces risk	Strata of this type do not contain material capable of ground gas generation, and do not represent a significant risk for methane generation.	CL:A RE: Research Bulletin RB17 A Pragmatic Approach to Ground Gas Risk Assessment (November 2012) [Section 3, Page 3] EPG: A pragmatic approach to ground gas risk assessment for the 21st Century (2011) [Page 2]
Thickness of Made Ground (if present on-Site)	Under 5m (with average of less than 3m)	0	Reduces risk	organic material present to generate significant volumes of methane, unless it has a significantly high organic content.	CL:A RE: Research Bulletin RB17 A Pragmatic Approach to Ground Gas Risk Assessment (November 2012) [Section 3: Page 4]
Period since Made Ground emplaced (if present on-Site)	>20 years	0	Reduces risk	of methane has been exhausted. Minor volumes may remain within the pore space however, which can be	CL:A RE: Research Bulletin RB17 A Pragmatic Approach to Ground Gas Risk Assessment (November 2012) [Appendix A, Page 10]
Existing building type (if applicable)	New development proposed	0	Reduces risk only if appropriate protective measures are included where necessary	Construction of new buildings offers an opportunity to design gas protection directly into the structure, with more flexibility and reliability than retrofitting an existing structure. Requirement for gas protection is informed by ground conditions.	CIRIA: C665 Assessing Risks Posed by Hazardous Ground Gases to Buildings (2007) [Table 8 6, Page 90] British Standard: BS8485 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (2015) [Table 86 Page 90]
Development type	Type D: Industrial (Industrial units, warehouses, factories, retail park sales buildings)	-2	Reduces risk	Commercial and retail spaces are likely to include large, well ventilated areas limiting potential for gas accumulation.	British Standard: BS8485 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (2015) [Section 7, Page 21]
Ground floor slab construction details	Not known	0	Does not reduce risk	Does not reduce risk	CIRIA: C665 Assessing Risks Posed by Hazardous Ground Gases to Buildings (2007) [Table 8 6, Page 90] British Standard: BS8485 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (2015) [Section 7.2, Page 23]
Development includes a basement?	No	1	Does not reduce risk	Where the development does not include a basement the majority of potential ground gas source material will likely remain beneath the Site.	British Standard: BS8485 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (2015) [Annex A Page 36] CIEH: The Local Authority Guide to Ground Gas (September 2008) [Section 7 Page 101]
If a basement is present, is this structure in contact with groundwater-bearing strata?	No basement	0	Does not increase risk	Not Applicable	EPG: Dissolved methane monitoring for ground gas risk assessment (September 2018) [Page 1]
Presence of off-Site sources with potential pathway to Site?	No	0	Does not increase risk	Where no potential off-Site sources exist, or where there is no direct pathway for these gases to migrate to the Site no risk exists.	
Total Assessed Score	-1				

In consideration of the above details the development is considered to be at

Very Low Risk

for ground gas issues.

Based on the sensitivity of the end-use receptor

no further ground gas investigation or assessment required.

D. Consultation Information

Appendices

436148, 295045

Order Details

Date: 28/02/2022
Your ref: MIRA_Land_South_of_A5_REQREF_114929
Our Ref: WTM1-8554627
Client: Clair Wilkinson

Site Details

Location: 435955 295013
Area: 60.04 ha
Authority: [Nuneaton and Bedworth Borough Council](#), [Hinckley and Bosworth Borough Council](#), [North Warwickshire Borough Council](#)



Summary of findings

p. 2

Aerial image

p. 8

OS MasterMap site plan

N/A: >10ha

groundsure.com/insightuserguide

Contact us with any questions at:

info@groundsure.com

08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
13	1.1	Historical industrial land uses	0	3	11	5	-
14	1.2	Historical tanks	1	0	1	1	-
15	1.3	Historical energy features	2	0	3	0	-
15	1.4	Historical petrol stations	0	0	0	0	-
16	1.5	Historical garages	0	0	0	0	-
16	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
17	2.1	Historical industrial land uses	0	3	14	8	-
18	2.2	Historical tanks	1	0	2	2	-
19	2.3	Historical energy features	5	0	3	0	-
20	2.4	Historical petrol stations	0	0	0	0	-
20	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
21	3.1	Active or recent landfill	0	0	0	0	-
21	3.2	Historical landfill (BGS records)	0	0	0	0	-
22	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
22	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
22	3.5	Historical waste sites	0	0	0	0	-
22	3.6	Licensed waste sites	0	0	0	0	-
22	3.7	Waste exemptions	1	0	17	9	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
26	4.1	Recent industrial land uses	2	1	4	-	-
27	4.2	Current or recent petrol stations	0	0	0	0	-
27	4.3	Electricity cables	0	0	0	0	-
27	4.4	Gas pipelines	0	0	0	0	-
28	4.5	Sites determined as Contaminated Land	0	0	0	0	-

28	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
28	4.7	Regulated explosive sites	0	0	0	0	-
28	4.8	Hazardous substance storage/usage	0	0	0	0	-
28	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
29	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
29	4.11	<u>Licensed pollutant release (Part A(2)/B)</u>	0	0	1	0	-
29	4.12	<u>Radioactive Substance Authorisations</u>	0	1	10	0	-
31	4.13	<u>Licensed Discharges to controlled waters</u>	0	0	2	0	-
31	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
31	4.15	Pollutant release to public sewer	0	0	0	0	-
32	4.16	List 1 Dangerous Substances	0	0	0	0	-
32	4.17	List 2 Dangerous Substances	0	0	0	0	-
32	4.18	<u>Pollution Incidents (EA/NRW)</u>	0	0	1	0	-
32	4.19	Pollution inventory substances	0	0	0	0	-
33	4.20	Pollution inventory waste transfers	0	0	0	0	-
33	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
34	5.1	<u>Superficial aquifer</u>	Identified (within 500m)				
36	5.2	<u>Bedrock aquifer</u>	Identified (within 500m)				
38	5.3	<u>Groundwater vulnerability</u>	Identified (within 50m)				
42	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
43	5.5	Groundwater vulnerability- local information	None (within 0m)				
44	5.6	<u>Groundwater abstractions</u>	0	0	0	0	2
45	5.7	<u>Surface water abstractions</u>	0	0	0	0	1
46	5.8	Potable abstractions	0	0	0	0	0
46	5.9	Source Protection Zones	0	0	0	0	-
46	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
47	6.1	<u>Water Network (OS MasterMap)</u>	3	3	4	-	-

48	<u>6.2</u>	<u>Surface water features</u>	1	1	9	-	-
49	<u>6.3</u>	<u>WFD Surface water body catchments</u>	1	-	-	-	-
49	<u>6.4</u>	<u>WFD Surface water bodies</u>	0	0	0	-	-
49	<u>6.5</u>	<u>WFD Groundwater bodies</u>	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
51	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
51	7.2	Historical Flood Events	0	0	0	-	-
51	7.3	Flood Defences	0	0	0	-	-
52	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
52	7.5	Flood Storage Areas	0	0	0	-	-
53	7.6	Flood Zone 2	None (within 50m)				
53	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
54	<u>8.1</u>	<u>Surface water flooding</u>	1 in 30 year, 0.3m - 1.0m (within 50m)				
Page	Section	Groundwater flooding					
56	<u>9.1</u>	<u>Groundwater flooding</u>	Low (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
57	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
58	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
58	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
58	10.4	Special Protection Areas (SPA)	0	0	0	0	0
58	10.5	National Nature Reserves (NNR)	0	0	0	0	0
59	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
59	<u>10.7</u>	<u>Designated Ancient Woodland</u>	0	0	0	0	1
59	10.8	Biosphere Reserves	0	0	0	0	0
59	10.9	Forest Parks	0	0	0	0	0
60	10.10	Marine Conservation Zones	0	0	0	0	0
60	10.11	Green Belt	0	0	0	0	0
60	10.12	Proposed Ramsar sites	0	0	0	0	0

60	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
60	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
61	10.15	Nitrate Sensitive Areas	0	0	0	0	0
61	10.16	<u>Nitrate Vulnerable Zones</u>	1	0	0	1	2
62	10.17	<u>SSSI Impact Risk Zones</u>	4	-	-	-	-
63	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
64	11.1	World Heritage Sites	0	0	0	-	-
64	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
64	11.3	National Parks	0	0	0	-	-
64	11.4	Listed Buildings	0	0	0	-	-
65	11.5	Conservation Areas	0	0	0	-	-
65	11.6	Scheduled Ancient Monuments	0	0	0	-	-
65	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
66	12.1	<u>Agricultural Land Classification</u>	Grade 3a (within 250m)				
68	12.2	Open Access Land	0	0	0	-	-
68	12.3	Tree Felling Licences	0	0	0	-	-
68	12.4	<u>Environmental Stewardship Schemes</u>	0	0	1	-	-
68	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
69	13.1	<u>Priority Habitat Inventory</u>	0	0	2	-	-
70	13.2	Habitat Networks	0	0	0	-	-
70	13.3	Open Mosaic Habitat	0	0	0	-	-
70	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
71	14.1	<u>10k Availability</u>	Identified (within 500m)				
73	14.2	<u>Artificial and made ground (10k)</u>	0	0	1	3	-
75	14.3	<u>Superficial geology (10k)</u>	6	1	3	11	-

76	14.4	Landslip (10k)	0	0	0	0	-
77	14.5	<u>Bedrock geology (10k)</u>	9	0	3	3	-
78	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
79	15.1	<u>50k Availability</u>	Identified (within 500m)				
80	15.2	Artificial and made ground (50k)	0	0	0	0	-
80	15.3	Artificial ground permeability (50k)	0	0	-	-	-
81	15.4	<u>Superficial geology (50k)</u>	5	0	2	4	-
82	15.5	<u>Superficial permeability (50k)</u>	Identified (within 50m)				
83	15.6	Landslip (50k)	0	0	0	0	-
83	15.7	Landslip permeability (50k)	None (within 50m)				
84	15.8	<u>Bedrock geology (50k)</u>	6	0	1	1	-
85	15.9	<u>Bedrock permeability (50k)</u>	Identified (within 50m)				
85	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
86	16.1	BGS Boreholes	0	0	0	-	-
Page	Section	Natural ground subsidence					
87	17.1	<u>Shrink swell clays</u>	Very low (within 50m)				
88	17.2	<u>Running sands</u>	Low (within 50m)				
90	17.3	<u>Compressible deposits</u>	Moderate (within 50m)				
92	17.4	<u>Collapsible deposits</u>	Very low (within 50m)				
94	17.5	<u>Landslides</u>	Very low (within 50m)				
95	17.6	<u>Ground dissolution of soluble rocks</u>	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
97	18.1	Natural cavities	0	0	0	0	-
98	18.2	BritPits	0	0	0	0	-
98	18.3	<u>Surface ground workings</u>	18	18	36	-	-
101	18.4	Underground workings	0	0	0	0	0
101	18.5	Historical Mineral Planning Areas	0	0	0	0	-



<u>101</u>	<u>18.6</u>	<u>Non-coal mining</u>	2	0	0	2	0
102	18.7	Mining cavities	0	0	0	0	0
<u>102</u>	<u>18.8</u>	<u>JPB mining areas</u>	Identified (within 0m)				
102	18.9	Coal mining	None (within 0m)				
102	18.10	Brine areas	None (within 0m)				
103	18.11	Gypsum areas	None (within 0m)				
103	18.12	Tin mining	None (within 0m)				
103	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
<u>104</u>	<u>19.1</u>	<u>Radon</u>	Less than 1% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
<u>105</u>	<u>20.1</u>	<u>BGS Estimated Background Soil Chemistry</u>	43	9	-	-	-
107	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
107	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
108	21.1	Underground railways (London)	0	0	0	-	-
108	21.2	Underground railways (Non-London)	0	0	0	-	-
109	21.3	Railway tunnels	0	0	0	-	-
109	21.4	Historical railway and tunnel features	0	0	0	-	-
109	21.5	Royal Mail tunnels	0	0	0	-	-
<u>109</u>	<u>21.6</u>	<u>Historical railways</u>	0	1	0	-	-
110	21.7	Railways	0	0	0	-	-
110	21.8	Crossrail 1	0	0	0	0	-
110	21.9	Crossrail 2	0	0	0	0	-
110	21.10	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 14/09/2019

Site Area: 60.04ha



Recent site history - 2017 aerial photograph



Capture Date: 13/08/2017

Site Area: 60.04ha



Recent site history - 2013 aerial photograph



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Capture Date: 09/07/2013

Site Area: 60.04ha



Recent site history - 2012 aerial photograph



Capture Date: 26/07/2012

Site Area: 60.04ha



Recent site history - 1999 aerial photograph



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Capture Date: 18/10/1999

Site Area: 60.04ha

